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The Builder

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Ancient Rome in 1885.*

THERE has always been a tendency, almost from the commencement of book printing and engraving, to produce works descriptive of the ancient and other remains of Rome, which have been welcomed by the public.

The number of such works is great, but not more than is needed by the engrossing interest of the old Roman city's marvels. These works range from the merest impressions of the passing traveller to the most formal class of guide-books; there are works with many illustrations, like Wey's "Rome," not long since published, but with no very reliable text for scientific purposes. There are not a few series of architectural plates, setting forth the remains, more or less carefully measured and drawn, from those by Palladio and Desgodets to the goodly volumes of Taylor and Cresy, the latter being a remarkable book, the best of the many works published by Englishmen. The former, while among the earliest series of published measured plates, is valuable also as showing the benefits to be derived by the student from the study of antique monuments, and it is sufficient to show the source of Palladio's purity of detail. Not a few other examples could be quoted of published monographs of buildings prepared by students in Rome, mostly French, in later years.

The succession of the dates when these works appeared shows the uniformity of interest taken, and of the ever-increasing demand for more information, while the number that have been produced in this country is commendable to our habits of research.

The tendency being to welcome such works, it would be hard if similar good fortune did not attend upon the latest issue of them all. Under the title of the present notice, and, considering the vastness of the theme, in the small limits of a handy octavo of 512 pages, Mr. Middleton contrives to render a mass of information upon the ancient monuments of the Eternal City. He gives naturally more ample detail of the results of the excavations of recent years. In all he compresses his matter into the fewest words. The work is not a guide-book,—it is not a book of measured plates. There are fifty-seven small wood-cuts (would that there were more) that well illustrate the text so far as they go, for they are clear and concise. In addition, there is a useful little map of Ancient Rome and a map of Modern Rome showing the contemplated changes, and we can be but gratified, on inspecting the position of the new quarter of the city, to notice how well it is kept away from the ancient built-upon portions, where it can grow according to modern needs of population without doing much harm to the ancient monuments. Lastly, there is a plan measured by the author and drawn by him, of the Roman Forum, in which are shown the exact positions of that wonderful gathering together of Temple, Forum, Basilica, memorial column, triumphal arch, and the like. This plan shows the result of the excavations down to the most recent discoveries, and it has the advantage of indicating by tints the principal materials used in the various buildings.

The author's combined architectural and archæological knowledge enables him to conduct his task with "attention to detail and modes of construction,—points which are usually passed over too lightly by those antiquaries who are without any practical acquaintance with the actual processes and materials employed in building." Some interesting items of technical information will be referred to as we proceed.

After referring to the various sources of information, such as the references to the classical authors, inscriptions, coins, and Mediæval and modern works, a brief list of the latter being given, the author proceeds to his first chapter, on the materials used in the ancient buildings. But scant justice is perhaps done to Donaldson's "Architectura Numismatica," the plates of which are described as not remarkable for accuracy, and Parker's series of admirable photographs comes in for greater praise, as might be expected, than his confused and rambling books.

The wholesale destruction of ancient remains that took place in Mediæval and later times is referred to,* and it must be a matter of regret for all time that such ruthless havoc was permitted by men who ought to have been the preservers of what had been spared by the hand of Goth and Vandal. Thus, the removal of the side arches of the Triumphal Arch of Gallienus, the stripping of the bronze from the dome of the Pantheon by Pope Urban VIII., and many others, are noted.

The site of Rome is described as a great plain of alluvial and marine deposit, with nine or ten hills of volcanic conglomerate, ashes, sand, and tufa, the traces of volcanic action being of such late date that in many places broken pottery and bronze implements have been found beneath the deposit. Facts such as these, as well as the recent discovery of an Etruscan cemetery, give considerable room for doubt as to the accuracy of the belief in

* Ancient Rome in 1885. By J. Henry Middleton. Edinburgh: Adam & Charles Black. 8vo. 1885.

* "The splendid porphyry columns of the Temple of Venus and Rome were broken up to build the kilns in which the equally magnificent marble columns were burned into lime on the floor of the temple."

the foundation of the city by the Roman race.*

Tufa being so abundant on the actual sites of most of the buildings, it is not surprising that it has been one of the principal building stones employed; but Alban stone, Peperino, Travertine, &c., were all employed. The use of the excellent cement concrete formed by pozzolana and sand has contributed in no small degree to the development of Roman construction, since so many forms capable of being built by its instrumentality would have been impossible had a less binding material been used. Thus the heavy mass of the vast dome of the Pantheon is formed of this everlasting concrete, as is the core of almost all the most massive walls and vaulting, sometimes cast between boards. Several of these concrete works are faced with brickwork neatly bonded in; arches are formed of carefully-constructed brickwork; and, indeed, the use of brickwork, *opus incertum* and *opus reticulatum*, &c., as a facing to masses of concrete may be studied with profit in these days when the use of concrete has again attracted public attention. The extent to which it was employed in ancient Rome may be, perhaps little known to many who are conversant with the old buildings, who may believe that the apparently solid brick constructions are, in fact, for the most part of concrete. The bricks used in Rome appear to have been stamped from the second century A.D., the stamps continuing to a late date, and these being for the most part readily deciphered, the date of construction can very frequently be determined. No examples of the stamps are given in the book before us, which is to be regretted, for their interest cannot be over-rated.

Precious marbles of all kinds, white statuary, Parian, Athenian, golden Numidian, green Cipollina, violet Pavonazetto, dull green Porta Santa, blood-red Rosso Antico, and a vast number of others were all pressed into the service of Roman architecture at varying dates, and used for all kinds of decorative purposes, particularly for wall linings. Their mere enumeration must afford an idea of how grandly aglow with colour must have been almost all the ancient buildings, the superb effect of the marble linings being enhanced with glittering mosaic floors and brilliant frescos or other paintings on dome and ceiling and roof. In presence of all that antiquarian research has ever taught of these old glories of colour, it must ever be a matter of surprise that, among ourselves, the seventeenth and later century revivals of classic forms witnessed but the bald, cold outline only, to the entire exclusion of all the old wealth of colour which had ever accompanied it in old times. This is the more remarkable since the first revival in Italy was marked by the development of arabesques in colour, inspired by the study of many ancient works then discovered.

Our author refers to the use of hard granites and porphyries, which could only have been worked by the help of emery or diamond dust. The perfect fitting nature of the blocks of stone forming the wall of pre-historic date, the so-called wall of Romulus, is referred to, and distinct marks of metal tools are to be found on them, sufficient to disprove the belief that the masses were simply split by wooden wedges. The use, however, of iron clamps run into lead, at a later date, and of wooden dovetailed clamps, is curious, as is the mode of fixing the marble facings with iron. "The wall stucco was applied in three or four coats, the whole being often more than two inches thick." The surface was prepared with great care to secure paintings, and was often polished to a surface like artificial marble, the first coat being held on not by a rough surface, but either by nails or small plugs of marble, which were driven into the surface of the wall to be plastered. It is not so stated, but, of course, this would be only for the best work. Interesting notes are given with respect to the course not only of the primitive wall, but of the probable direction of that of *Roma Quadrata*, and of those of the Regal period* and of later times, including the position of the gates and the great Agger of Servius. A good cut shows the construction of the massive brick-faced walls of Aurelian, with its bold square projecting towers and its lofty inner arches. Following a brief notice of the various sewers of the city, the construction of which it is suggested was derived from the partly Hellenised Etruscans, is a shorter one of the river embankments, credit being given to Mr. Parker for having first noticed a piece of Etruscan-like wall near the Cloaca Maxima. The Mammertine Prison, alluded to by Juvenal as being the only prison needed in the happy early days of Rome, is shown by plan and section.

Three whole chapters are devoted to the elucidation of the mass of buildings on the Palatine Hill, and these are shown to be of all ages, some being of remote antiquity, but since their discovery and uncovering, exposure to the weather has caused them to crumble rapidly. The foundations are revealed of a temple called that of Cybele, and of Jupiter Stator, and a woodcut is given of the curious early altar to the Unknown God, while another renders the ground-plan of the so-called House of Livia, a well-preserved and complete specimen of a Roman house of the time of Augustus. The palace of that Emperor is described, and also those of Caligula, Domitian, Hadrian, and Severus, with the mass of accompanying temples and basilicæ, a passing reference being given to the supposed Church of St. Maria Antiqua. Doubt is expressed as to its Christian date, there being a marble-lined cistern in the apse where we should have looked for the site of the altar. Several technical points relative to these buildings, which, in some cases, determine their dates, are pointed out; thus, very thin bricks with wide joints are attributed to the end of the second century; some of the paintings are on walls lined with flanged tiles to prevent wet soaking through; and the flue-tiles from the heating furnaces are found to be held together by strong pieces of T-iron.

The Forum Magnum and its adjacent buildings occupy the whole of chapters v. and vi.,—a short history being prefixed showing the rise and progress of its buildings from the time when the site was but an intermediate valley filled at times with stagnant water, or, when dry, when it was the battle-ground of the Sabines dwelling on the hill of the Capitol and the Latins of *Roma Quadrata*. The construction of the *cloaca*, which runs across the site, was the first step towards converting the site into dry ground, but the ponds,—Lacus Curtius and Lacus Servilius,—remained until later. The world-famed buildings of the Forum had their beginnings in remote times, and were frequently rebuilt, as is very sufficiently shown by the excavations, which have revealed the foundations of early times built into those of later date, not in one spot only, but in every direction of the clearances.

A sketch is given of the Church of St. Adriano, which is probably the Curia rebuilt by Diocletian. It is a mass of ancient brickwork, relieved with stucco mouldings, and lined out in blocks. The sketch shows the ancient bronze gates now in the Church of St. John Laterano, the ancient level being about 20 ft. below the present modern surface, showing eloquently enough how great has been the accumulntion of earth during the many centuries that have elapsed since Roman times.

The site of the *Rostra* of Julius Cæsar is now determined, and two interesting woodcuts show the plan and a section, while small detail sketches give the way in which the marble face-work was secured to the wall of tufa behind, the marble cornice and plinths being carefully dowelled, the position of the bronze gallery beaks being determined by the holes which remain in the tufa wall. The entire width is 78 ft., and there have been two colossal figures at the extremities. The remains which have been uncovered correspond with a bas-relief from the arch of Constantine, which shows the upper portion of the *Rostra* as well as the adjacent buildings.

Behind the *Rostra* are the remains of a richly-decorated platform, curved on plan, which has been lined with Greek marbles, and the extremities of the curve are the probable sites of the *Umbilicus Romæ*, or central point of the city; and the golden milestone (gilt bronze) inscribed with the names and distances of the towns of Italy. To the right of the *Rostra* is the Arch of Severus, while to its left was most probably the site of the smaller Arch of Tiberius, the Temple of Saturn, with its portico of Ionic columns being behind the latter arch, and the Temples of Concord and of Vespasian behind and beyond the *Rostra*, while above these latter towered the rock of the Capitol. The plan already referred to shows with much clearness the course of the Sacred Way, and the site of the enormous Basilica Julia, with its white marble pavement and treble row of piers; of which, alas! little remains, owing to its being burned for lime in Mediæval times. The plan indicates the position of all the buildings surrounding the open part of the Forum, in face of the *Rostra*, the Temple of Castor, the circular Temple of Vesta at some distance away, as well as the bases of the seven honorary columns parallel to the Basilica Julia. A separate cut is given of the basement plan of the Temple of Castor, showing the huge spurs on which the columns were built, and another which will be scanned with much interest shows the plan of the newly-discovered House of the Vestals, and its relation to the circular Temple of Vesta. Its two stories are shown by a section indicating its relation to the Palatine Hill, and the mode of construction of some of its floors on the necks of the huge Amphoræ.

Reference is naturally made to the remarkable discovery of the portrait statues of the Vestals, which are of heroic size, with inscribed pedestals, although unfortunately the latter cannot be identified with the statues. One of the best of the wood-cuts shows a portion of one of these statues to a sufficiently large scale to enable us to judge of the excellence of the workmanship.

Passing reference is made to the sites of the arches of Fabius, the earliest of the triumphal arches, and that of Augustus, and the chapters conclude by reference to the other most recent discoveries in the Forum.* The plan already referred to indicates the singular want of symmetry of the buildings of the Forum, which appear to have been placed in a very hap-hazard manner, sufficient to show that there never was any preconceived plan for the whole, and that they grew out of the requirements of the times.

Chapter viii. is devoted to the description of the buildings, &c., on the Capitoline Hill, the early walls, and the ancient temple of the Capitol, there being in this section a digression upon the period of Augustus, illustrated by the inscriptions from the temple of Ancyra, which enumerate the works which this emperor erected in Rome.

The Imperial Fora form the theme of the eighth chapter, there being plans of the Fora of Julius, Augustus, and Nerva, showing the positions of these buildings, which although of similar destination, yet are adjacent one to another. Another plan shows the Forum of Trajan, entered by the triumphal arch, and having his column at the side of the enormous Basilica Ulpia.

Chapter ix. is devoted to the theatres, &c., the Circus Maximus, the theatres of Pompey and of Marcellus and others, being described, the amphitheatres being reserved for the tenth chapter. In this the Colosseum naturally takes the first place. The baths are treated of in the eleventh chapter, and a plan is given showing the results of the recent excavations at the back of the Pantheon, on the site of the

* Many discoveries made during recent years show that Rome was populous at a very remote and quite prehistoric period.

* A small engraving shows various masons' marks on walls of the Regal period. Many of them are letters of early form.

* It may not be amiss to indicate for the guidance of students who may possess the older works on the Roman antiquities, that the three graceful columns mostly described, in these, as belonging to the Temple of Jupiter Stator, are now shown to have been a part of the Temple of Castor. In like manner, the three angular columns said to be part of the Temple of Jupiter Tonans, are now assigned to the Temple of Vespasian; while the Temple of Concord is called so no longer, but the Temple of Saturn.

Baths of Agrippa. The two buildings line out so exactly that it is difficult to follow our author's belief that they had no connexion. The connexion of plan is not unlike the relation of the Albert Hall to the Inventions Exhibition, and some sort of similar connexion and joint use appears hardly capable of doubt. The Golden House of Nero is described, and a plan is given, while others show the Baths of Titus and of Caracalla. The twelfth chapter describes various other existing remains of Rome; the thirteenth, the tombs and memorial columns. The fourteenth is occupied by the aqueducts and the water-supply, several curious details being given of the plumbers' work of more than eighteen centuries ago, where we may see that four-way pipes, soldered joints, and stop-cocks were in use, as well as soldered lead supply-pipes, which were general.

The book concludes with the fifteenth chapter, which describes the construction of the roads, the bridges, and the wall of the Emperor Aurelius.

The work is a very valuable addition to our knowledge of the ancient buildings of Rome. Its author may be congratulated for having brought to a focus, so to speak, a vast amount of information from various sources into small and readable compass. Of this information it is evident that a large proportion is the result of his own investigations.

AMERICAN PLUMBING: SANITARY SPECIALITIES.

BY AN AMERICAN ARCHITECT.

ENGLISH plumbing was undoubtedly the progenitor of American plumbing. The offspring is lusty, and differs materially from the original, both in the manner and material of which it is composed.

I do not propose to describe all the American specialities, but there are many things which I think would be interesting, if not instructive, to Englishmen interested in building.

But our plumbing is not, properly speaking, plumbing at all, as lead enters into it only to a very limited extent. In the United States, iron soil, waste, and supply pipes are used, to the exclusion (of course, there are a few exceptions) of lead pipes. Branch wastes, where bending is necessary, less than 2 in. (about 5 centimètres) in diameter, are sometimes made of lead.

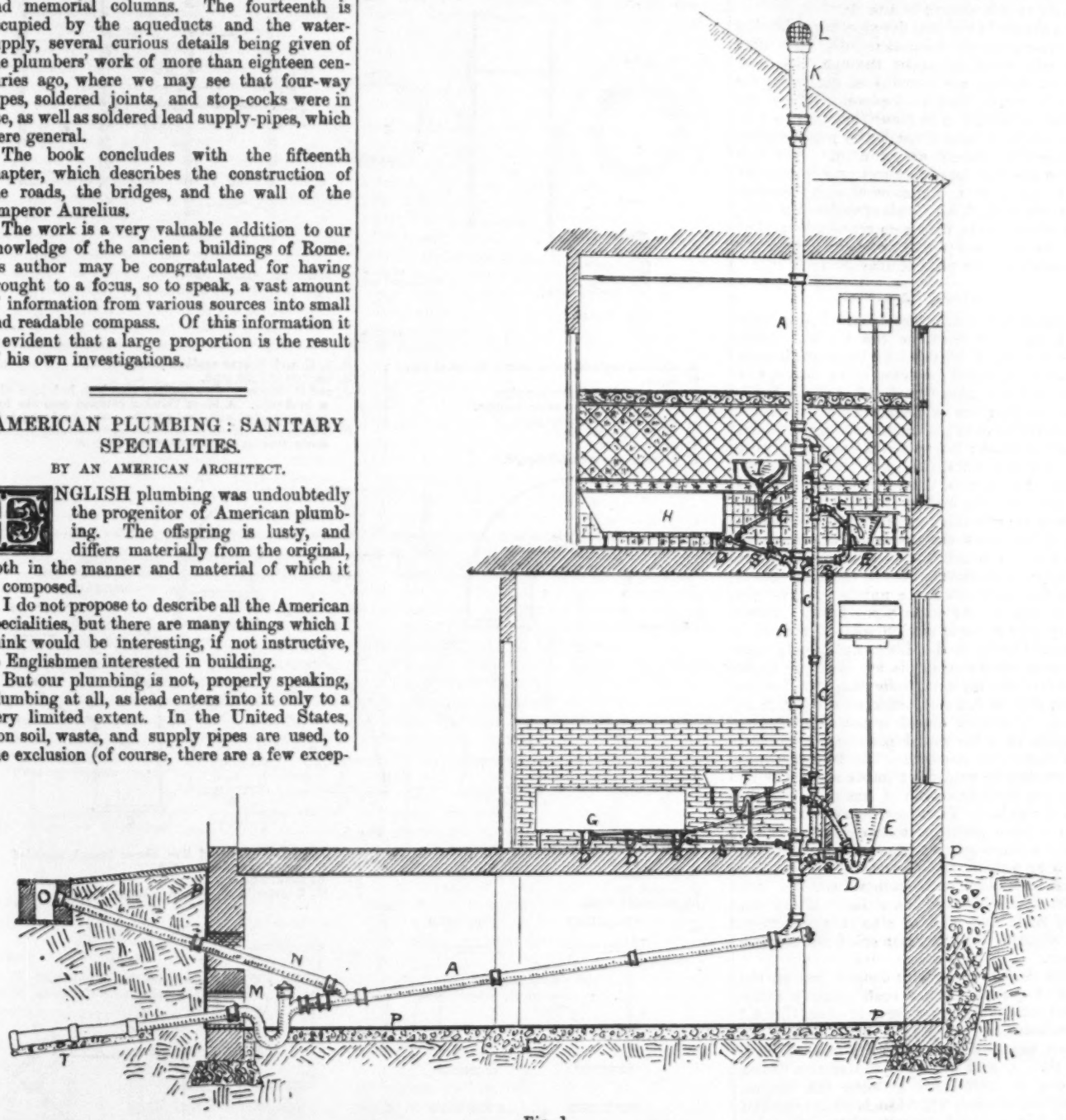


Fig. 1.

A. Main soil-pipe.
C. Vent-pipe, with branches entering from the traps of various fixtures.
D. D-traps vented.
E. Water-closets.
F. Kitchen sink, with vented traps beneath.
G. Laundry tubs.
H. Bath-tubs.
I. Wash-basin.
K. Enlarged soil-pipe.
L. Wire basket.
M. Running trap.
N. Fresh-air inlet.
O. Grating in pavement, forming entrance to cold-air inlet.
P. Asphalt coating over a concrete cellar bottom, extending through the wall as a damp-proof course and up the side of the wall as an impervious coating.
S. Branch waste-pipes.
T. Terra-cotta pipe laid on concrete.
U. Glazed tile facing on the walls of bath-room.
Z. Glazed brick in kitchen.

Soil-pipes and their connexions are manufactured in sizes varying from 2 in. to 15 in. in diameter. Pressure-pipe comes in 12 ft. sections. Well and spiggot pipe, 5 ft. long. Durham, 20 ft. Sanitas, 3 ft.

THE INSIDE SEWERAGE SYSTEM.

The term "drainage system," as this is sometimes called, should only be used to designate agricultural or land tiles, which drain off pure water. As soil and waste pipes convey sewage, I designate them when in place, as the inside, or house sewerage system.

In America, one vertical soil-pipe is used, and into it are branched the wastes from water-closets and basins, bath tubs, laundry tubs, kitchen sinks, &c. The plan of the house is so arranged that the apartments containing these come over each other in the different stories, and the fixtures are grouped about the soil-pipe, the horizontal branches being made as short as possible. In large houses there are sometimes two or more vertical soil-pipes, so as to avoid the necessity for running long horizontal pipes.

In our cities the sewers are usually placed in the streets, while kitchens, bath-rooms, and water-closets are almost invariably situated at the back of the house. For the above reason the sewer must run beneath the building as the entire site is usually covered in width. The material, manner of trapping and ventilating plumbing is governed by "Plumbing Regulations" or laws in the large cities of the United States. The illustration (fig. 1) shows a house fitted up in accordance with "Regulations" as usually drawn up. The house system commences with the sewer connexion. Here a special fitting is required, usually put in by the city authorities, so that the public sewer will not be impaired. From this connexion to the building salt-glazed terra-cotta pipe is used, commonly 5 in. inside diameter. In the best work these pipes are bedded on concrete, so the alignment will be and remain perfect. In cheaper work the earth is hollowed out under the hubs or bells, so that the length of the pipe will have a solid bearing on the earth. The joints are made with cement and sand in equal parts, and the inside swabbed out, so that no hard projections can form on the inside to catch the sewage.

A 4 in. (about 1 decimeter inside diameter) iron pipe is connected with this terra-cotta one just outside of the building line. The iron pipe passes through the wall, an arched opening being left for the purpose. If the wall should settle the pipe will remain intact. Just inside the building is usually placed the S or V running trap (fig. 1). These traps have inspection holes. On the house side of the trap a branch is introduced, running out to the curbing for a fresh-air inlet. This is covered by a grating let into and even with the pave-

ment, if on the side walk, and by a hood if on a grass plat (see detail illustration, fig. 6, C).

The pipe then runs along the wall as shown in the illustration, either supported by hooks built in the wall, or by hangers screwed into the joists. When this sewer-pipe is run beneath the ground, and this is sometimes found necessary, it is usually buried with its simple earth covering. In the best work it is built into a solid mass of concrete, if it is impossible to keep it exposed for its whole length, as it is always best to do.

As shown in the cut, the pipe turns leaving a screw-plugged inspection-hole, and runs vertically until it passes through the roof. Proper fittings are inserted at each story for branch, waste, and vent pipes. Where the climate is as cold as in New York City, a 4-in. pipe where it runs through the roof becomes completely choked up in frost. For this reason the last length of soil-pipe is enlarged from 4 in. to 6 in., and covered with a copper-wire basket (fig. 6, A). Cowls of various patterns, and return bends, that were commonly used at the top of a soil-pipe, have been universally discarded for the plain ending shown in cut.

DETAILS OF PIPING.

Cast-iron bell and spigot jointed pipe is the kind generally used in the United States. This pattern is moulded in three qualities or thicknesses, called pressure, extra heavy, and light cast-iron pipe (see fig. 2, C, E, H, I, K). Pressure pipe was originally manufactured for the conveyance of gas or water under pressure, hence its name; but now it is frequently used for the horizontal soil-pipe in the inside sewerage systems of the best houses. The bell is shaped so as to best fit it for caulking, being at least an inch thick on the outside. The cut (fig. 2, H) shows the groove on the inside of the bell into which the lead is driven when the pipe is caulked. This is the best, but it does not have the same number and variety of fittings as the other pipes have. Extra heavy pipe is the kind used where the work is supposed to be good. Light pipe is only used where or when economy is a necessity. Light pipe is often very imperfectly cast, with flaws or holes, thin on one side, thick on the (fig. 2, E) other. The latter defect is caused by casting the pipe in a horizontal position,—a method fast becoming obsolete. The bells or hubs are cracked by caulking; joints are made by inserting the spiggot end of one pipe into the bell of another. The space between is packed with a hemp gasket or unravelled rope for the height of three-quarters of an inch, being driven down by a chisel made for the purpose. The bell is then filled with molten lead, and it is driven firmly home with a chisel. When properly made this kind of a joint is permanent and effective, gas and water proof, and slightly elastic.

The Sanitas pipe, with flanges cast on the ends of each piece, has been recently introduced into the market by a Boston (U.S.A.) manufacturing company. The flanges are drawn together by screw-bolts (see fig. 2, L and F). A lead washer of the section shown in cut is introduced between the flanges. Being star-shaped, when the bolts are screwed up tightly, the lead washer is flattened, and a good joint formed. A ratchet wrench is necessary where the pipe is put back in an indent or recess.

This method of jointing pipe has not been in the market long enough to have its merits or faults fully determined. While the cast-iron bell and spigot-pipe can be easily cut to suit any length, with the flange-pipe it is necessary to make the space between the fittings suit the pipe. To meet this want short pipes are supplied, only varying 1 in. from each other in their length. Wrought-iron pipe is being used with screw-joints, having been introduced by the Durham Drainage Company, of Chicago. Wrought-iron pipe is furnished in 20-ft. lengths, and ¼ in. thickness of metal. A soil-pipe of this kind can extend from floor to floor, even when the pitch is high, without a joint, the pipes and fittings in this system of plumbing standing upon their own foundation, independent of movements in the walls or floors. The screw-joint is one of the best forms, being the strongest, most elastic, and easily made water and gas tight (see fig. 2, G and M).

Connecting lead pipe with iron is performed in the manner shown in fig. 2, D, G. A brass thimble is caulked into the bell of the common pipe, or screwed into a fitting of the Durham. The thimble is tinned, and the lead pipe connected with it by a wiped solder joint.

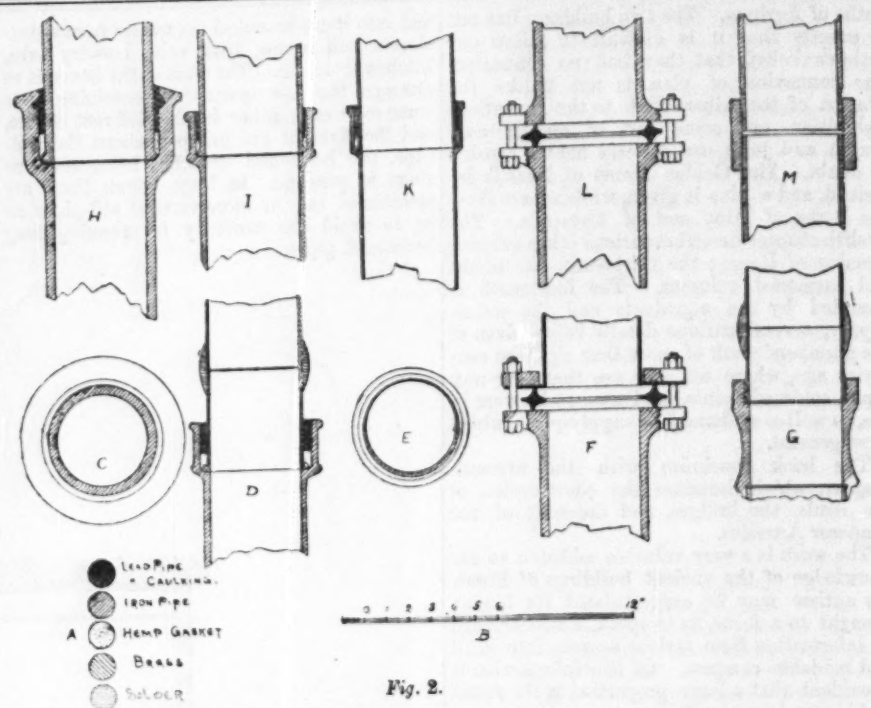


Fig. 2.

A. Graphic explanation of metals shown in cut.
B. Scale.
C. Cross section of pressure-pipe.
H. Vertical section of pressure-pipe.
I. Extra heavy cast-iron pipe.
K. Light cast-iron pipe.
L. Sanitas pipe.
K. Durham or screw joint-pipe.
H, I, K, and D have caulked joints.
E. Section of light pipe.
G. and D. Method of connecting cast-iron hub-pipe with a lead pipe. A brass thimble caulked into the hub and connected with lead-pipe by a wiped solder joint.
F. Sanitas pipe connected with lead by a solid ring screwed down over its compressible lead washer.

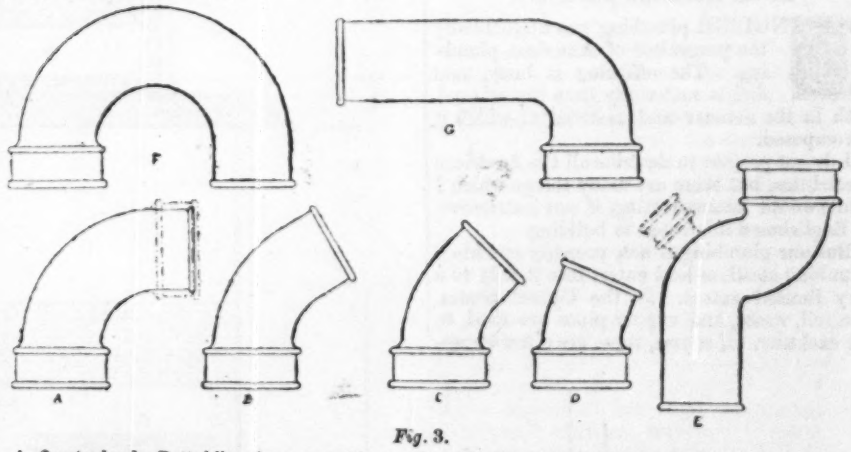


Fig. 3.

A. Quarter bend. Dotted line shows one with a double bell.
B. Sixth bend.
C. Eighth bend.
D. Sixteenth bend.
E. Off-set. Dotted line shows branch supplied on off-set when needed.
F. Return bend.
G. Quarter bend, with long outlet.

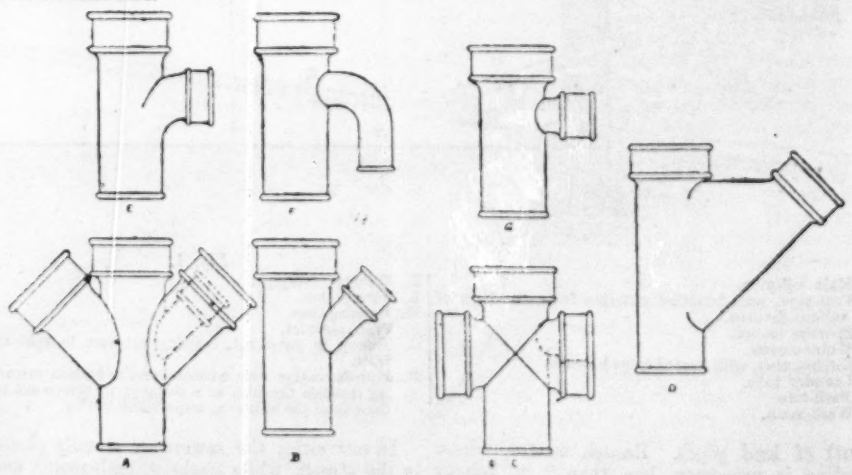


Fig. 4.

A. Double Y-branch. The dotted line shows 4 in. and 2 in. combination Y.
B. Y-branch.
C. Double T. Dotted line shows a fitting with small T on one side.
D. Anti-siphon Y-branch.
E. A T Y-branch.
F. Branch fitting, commonly used in connecting a soil and vent pipe placed above the connexion with the highest fixture.
G. T-branch.

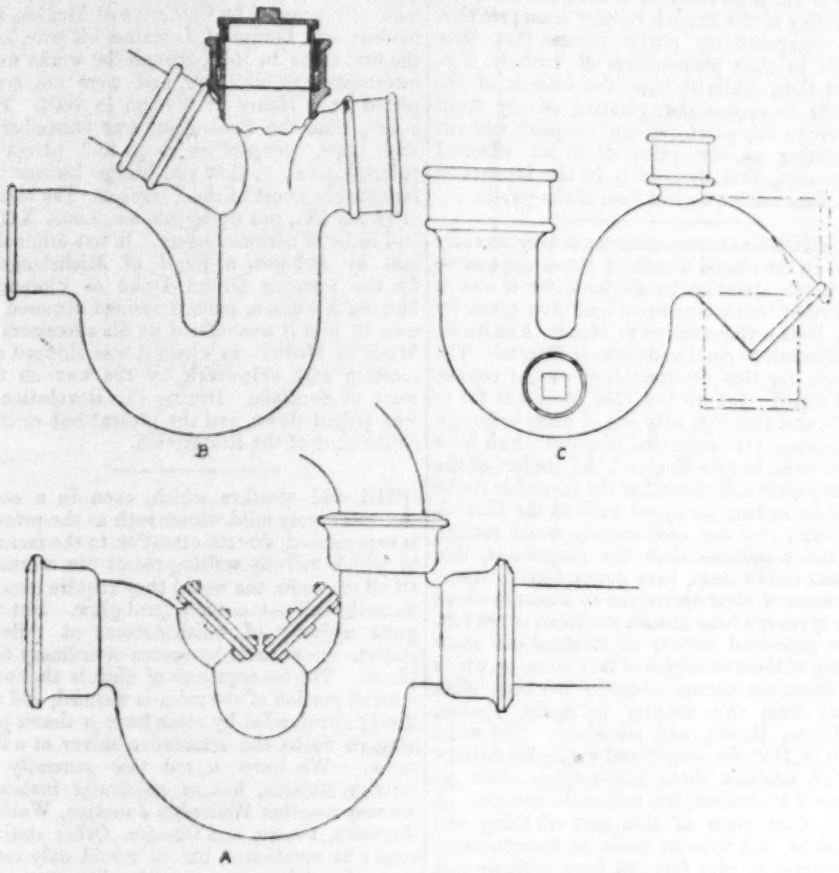


Fig. 5.

A. Pressure-pipe trap, with inspection holes and fresh air inlet.
B. Shows a running trap with a T Y branch for soil-pipe, a Y-branch for fresh air inlet. The inspection hole has a brass screw plug caulked into it. This forms an excellent and convenient fitting for the purpose.
C. A simple running trap, into which a Y-branch or quarter bend must be caulked to make the connexion with the soil-pipe.

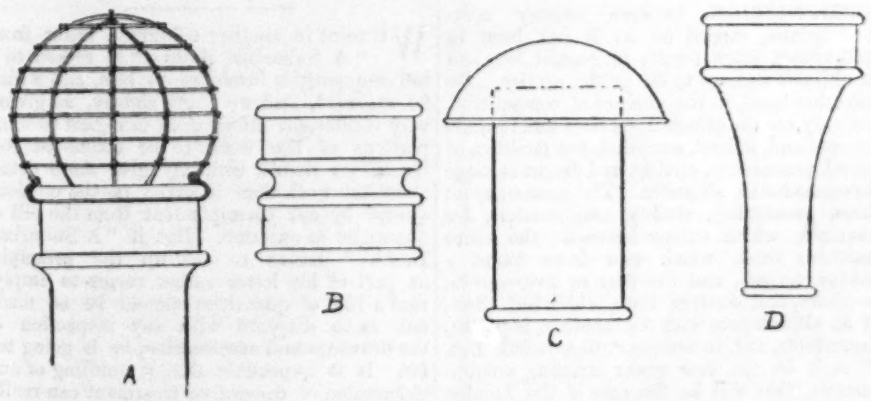


Fig. 6.

A. Outlet or top of soil-pipe with the wire basket.
B. Double hub or shelve.
C. Cap or hood for fresh-air inlet.
D. Increaser or decreaser.

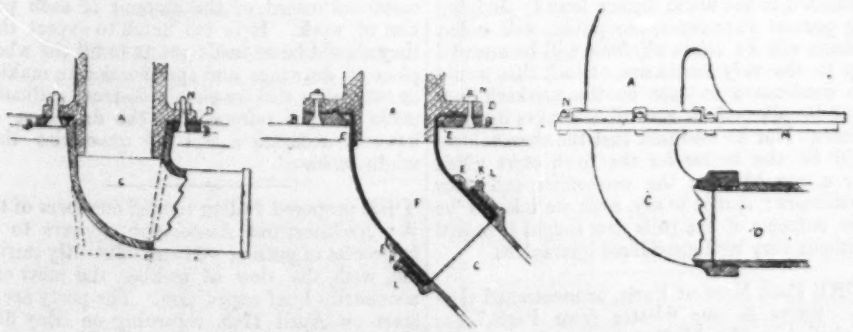


Fig. 7.

A. Outlet of closet, cast-iron pipe cast.
B. Brass plate screwed to the iron pipe, soldered to the lead pipe.
D. Cement.
E. Solder.
F. Lead pipe.
K. Brass thimble, around which the lead pipe is lapped and driven into the bell of the iron pipe.
L. Lead caulking.
N. Screw bolts.

In connecting with a Sanitas pipe, the edge of the lead pipe is beaten out until it covers the lead washer. An iron ring is placed over it and the pipe screwed tightly down by bolts. Iron thimbles, with lead sleeve cast around them, have been recently introduced to caulk into iron pipe. A few years ago plain iron pipes were put in position without any coating to protect them from oxidation. Then it was the common custom to have the pipes painted (dipped) inside and out with metallic paint. Now all the pipe in use is coated with asphalt. When well done it looks as if it were japanned. This is supposed to protect the pipes from oxidation and form a thoroughly durable coating. It has not been in use long enough for its durability to have been tested properly.

Enamelled iron pipes are used to a limited extent. These pipes are coated on the inside with porcelain enamel, and have a pretty and cleanly appearance. The cost limits the use. I think it would be found that the hammering incident to caulking and cutting would break the enamel off.

PIPE FITTINGS.

The common, Durham, and Sanitas pipes have each fittings for the purpose of making bends, branches, connexions with traps, and fixtures. These fittings are for the same purpose, and are practically the same shape, in each case. The difference consists in the bell and spiggot flange and screw ends to adapt them for joining with the pipe which they accompany. In the illustration I have only shown those with the common end.

Fig. 3 represents a number of bends in common use. They are found necessary where a line of piping deviates more or less from a straight line. The return bend was commonly put on the top of the soil-pipe after it passed through the roof. It is rarely used for that purpose now. Branch fittings are shown in the cut (fig. 4). They are made suitable for nearly every conceivable branch from one line of pipe to another. Y branches should always be used in soil-pipes. T-branches can be used in vent-pipes. The detailed view (fig. 4) in connexion with the small sectional view (fig. 1) will show the utility of these fittings. Running traps should always, I think, be placed between the sewerage system of the house and the city sewer. In a majority of cases they are so placed. A few men of standing are opposed to the use of this trap. They wish to ventilate the public sewers through the private houses. This article is not the place to discuss the merits of the case, but I will say that it might be a good idea to omit the trap if the plumbing and sewers were all models of excellence,—a state of things to be hoped for, but not expected. The common types of these traps are shown in fig. 5, with their inlets and inspection holes. One is for pressure-pipe with inspection covers bolted on (B), used by the Durham Company. Another (A) has a branch for the house sewer, an inspection-hole with a trap screw caulked into it, and a branch to receive the fresh air inlet. Inspection-covers are sometimes made in the form of plates with hooks intended to screw on to an inclined plane, a worthless cover. The other two mentioned are good. Decreaser, double hubs, hood, and end are shown in the next cut (fig. 6).

In the last few years small simple devices have been introduced for connecting water-closets with the house sewerage system (see fig. 7). The point to be attained is the same in each case. Not many years ago the stability and immobility of the floor was depended on to keep the joint of the closet perfect. As joists shrink and walls settle, the joints often come open. A piece of sheet lead and putty forms a very imperfect joint. The iron connexions consist of a plate cast on in one piece with an eight or quarter bend. On this plate the closet is bolted, cement being introduced between the flange on the outgo of the closet and the plate mentioned. The face of J. L. Mott's water-closet plate is finished with brass, and the end of the fitting is suitable for caulking into the bell of the common cast-iron pipe. The Durham plate is screwed into their fittings. The Meyer-Sniffen plate is for connexion with a lead pipe. A brass-plate through which a lead pipe is introduced, and to which it is soldered, is bolted to the bottom of the closet. This is clearly shown in the accompanying cut (fig. 7).

Iron pipe is supposed, in the United States, to be much better than lead for soil and waste pipes. Neither rats, mice, ants, nails, or umbrellas can make a hole in iron. There are recorded cases where lead pipes have been

destroyed by each of the above-mentioned causes. The concentration of carbonic dioxide or carbonic acid gas in sewer air seems to have a decidedly hurtful action on lead pipes when not properly ventilated. There are some interesting specimens in the Museum of Hygiene, U.S. Navy Department, Washington, D.C., full of holes, evidently caused by the carbonic dioxide of sewer air.* Sewer air does not act upon iron in this destructive way. I have seen plain iron pipe (neither coated with asphalt nor paint) taken out without being materially damaged, after years of service. Lead pipe, where carried horizontally, is liable to sag and form traps in the pipe, thus cutting off the air and ventilation. Iron pipe can be carried long distances, forming a perfect alignment.† GLENN BROWN.

NOTES.

FROM the Vestry of Chelsea we have received an interesting report (drawn up by Mr. Mossop, Chairman of the Electric Lighting Committee, and Mr. G. R. Strachan, Surveyor to the Vestry), for presentation to that Committee, on the Provisional Order for which the Chelsea Electricity Supply Company are making application to the Board of Trade, and which, if confirmed by Parliament, will authorise the Company to erect and maintain electric lines and works and to supply electricity within the parish. The maximum price to be charged by the Company is 10d. per unit. With regard to the conditions of purchase, the Committee had already come to the conclusion that a modification of the stringent purchase section of the Electric Lighting Act, 1882, is necessary, if electric lighting is to be secured to the public at the present time. The section, it appears, is known as the "old iron" section, because it is said, by persons interested in these undertakings, to hand over to the local authority the whole of their plant at the value of old iron. The object of the section is, notwithstanding, as the reporters say, a legitimate and beneficial one, "but its terms are calculated to strangle any attempt to induce the public to invest money under it." "When it is remembered," they continue, "that the science of lighting by electricity has made substantial progress since 1882, that some of the then practical difficulties have been overcome, and that it is now possible to offer a better light at a cheaper rate, and yet, that it is almost impossible to raise capital for electric lighting purposes under section 27, it must be conceded that if the object of the section can be secured, and at the same time its terms widened so as to give reasonable scope to investors, a most desirable end will be attained." In this spirit the reporters have had conferences with the promoters, and as a result submit for the consideration of the Committee a clause satisfactory to them, and which they say should not be unsatisfactory to the public. The clause extends the time of compulsory surrendering of the undertaking to the local authorities from twenty-one to thirty-five years.

TO say that the necessity of the railway companies is the opportunity of the public, may, at the first glance, be called cynical. Yet it cannot be doubted that it is on the occasion of their seeking fresh Parliamentary powers, and on these alone, that the powerful, although not too prosperous, carrying companies that quarter the United Kingdom amongst them, show any marked disposition to listen to the complaints of passengers and of freighters. The prosperity of the railway companies is an essential part of the prosperity of the country. The dividends that they now earn are,—it is not for the first time that we express the opinion,—disproportionately small. A comparison of the English and of the French systems of railway, and of the profits of the respective shareholders, leaves but little room for doubt that it is to the impolicy of the English railway managers that the comparatively pitiful return that they make to their shareholders is entirely due. And thus, while it is in the interest of the public to oppose the granting of any fresh power to any great railway company without obtaining as the price of it an effectual guarantee, that demand is in the interest of the shareholders no less than of the public.

A SHORT announcement made very recently in the official *Gazette* of Rome appears to be worth attention in England, for it was to the effect that a concession had been given by the Italian Government to Messrs. Armstrong & Mitchell to erect ironworks at Puzzuoli. The reason for this determination was, of course, not stated; but we fear that it is not far to seek, and that it is only one of many unhappy outcomes of the industrial disputes which have gone so far to ruin England. All readers of the newspapers will remember the miserable strike that for so long paralysed work at the Elswick factory; and one can scarcely avoid coming to the conclusion that the proprietors, like others before them, have determined to transfer some of their operations to localities where the tyranny of the British workman is not felt. The industrial history of England can show many of these examples of late years, by which an enormous amount of capital has been taken away from this country to Spain, France, Belgium, Russia, and elsewhere. The worst of it is, that the conceit and wrong-headedness which produce these catastrophes show no signs of abatement, but rather the reverse. A few more years of this sort of thing and England will have no trade or manufactories remaining to play fast and loose with, as it is not to be supposed that capitalists will go on indefinitely losing money to please the Trades Unions and the self-complacent gentlemen who make their fortunes in connexion with them.

COMPETITION between railway companies, carried on as it has been in well-known cases, results in general loss and in ultimate damage to the public service. On the other hand, in the absence of competition, not only are the utmost legal fares and freights exacted and, indeed, exceeded, but facilities of travel, punctuality, civility, and decent carriage accommodation, all suffer. The contrast as to fares, punctuality, civility, and comfort, for example, which exists between the three northern lines, which now have found a *modus vivendi*, and the four or five eastern, southern, and western lines, which but little, if at all, compete with one another, is patent, lamentable, and, in some sort, disgraceful. But, if such be the case under existing circumstances, what will be the case if the London and Brighton and the London, Chatham, and Dover lines are allowed to get in the small end of the wedge of amalgamation, with the probability that the South-Eastern will be attracted to the union before long? Judging by present experience, the public will suffer. Trains will be taken off, fares will be screwed up to the very maximum. Stock that would be condemned at once on the northern lines will be allowed to run till it shakes itself to pieces. Nor do we think that the shareholders will be the better for the fresh start given for a war between the companies and their customers; that is to say, such we take to be the outcome of the Bills now sought if passed without very well-considered guarantees.

THE Pont Neuf at Paris, as mentioned elsewhere in our "letter from Paris," has stultified itself and belied the Parisian proverb, "Solide comme le Pont Neuf," by showing serious signs of giving way and threatening to disappear bodily into the Seine. Great as have been the transmogrifications of Paris, so integral a portion of the metropolitan history cannot be left to be replaced by a modern structure, and it is to be hoped that speedy means will be found for strengthening the defaulting piers. This bridge, however, is not the first of its race, the earliest one having been destroyed by fire and the second by a violent storm. The present bridge, indeed, dates from Henry III. who, accompanied by Catherine di Medicis, his mother, and Louise of Lorraine, his wife, laid the first stone in 1578, though the works were interrupted by civil war, and were not completed until Henry IV.'s reign in 1604. For a long time the Pont Neuf was encumbered with tents, occupied as shops and places of entertainment, so that the bridge became the fashionable resort of the Parisians. The statue of Henry IV., put up by his son Louis XIII., had rather a curious history. It was originally cast by Bologna, a pupil of Michelangelo, for the reigning Grand Duke of Florence; but, on his death, nobody seemed disposed to own it, and it was offered by his successors to Marie di Medicis, to whom it was shipped off, meeting with shipwreck by the way on the coast of Sardinia. During the Revolution it was pulled down and the present one erected at the time of the Restoration.

THE cold weather which, even in a comparatively mild winter such as the present is experienced, directs attention to the manner in which railway waiting-rooms are warmed. Of all places in the world they require general warmth, and not a mere local glow. But the great majority of waiting-rooms at railway stations are warmed by means of ordinary fireplaces. The consequence of this is that only a small portion of the room is warmed, and the fire is surrounded by some have a dozen passengers, whilst the remainder shiver at a distance. We have stated this generally of railway stations, but as particular instances we may mention Willesden Junction, Watford Junction, Crewe, and Chester. Other stations might be mentioned, but it would only cause us to chronicle an uninteresting list of names. It is sufficient to point out that, as opportunity offers, every station waiting-room should be heated with slow combustion stoves; they would add to the comfort of passengers and save the pockets of the shareholders.

WE print in another column a letter from "A Suburban Builder" in regard to a bill of quantities furnished to him, and which he regarded, and we think rightly, as giving very insufficient information in regard to some portions of the work to be estimated for. Quantities should certainly give more detail about the work than is given in the portions quoted by our correspondent from the bill of quantities in question. But if "A Suburban Builder" means to set up the principle, as part of his letter rather seems to imply, that a bill of quantities should be so made out as to dispense with any inspection of the drawings and specification, he is going too far. It is impossible that a building of any elaboration of decorative treatment can really be analysed down into a priced quantity list. The drawings of a building exhibit the style of work as quantities can by no possibility exhibit it: the quantities form an authoritative statement and record of the amount of each portion of work. It is too much to expect that they should be so made out as to fill the whole place of drawings and specification in making an estimate; and we should distrust estimates made without reference to the drawings, on however accurate a bill of quantities they might be based.

THE proposed Italian tour of members of the Architectural Association appears to be in process of getting well and efficiently carried out, with the view of making the most of a necessarily brief expedition. The party are to start on April 17th, returning on May 6th, giving two days to Milan, four to Florence, six to Rome, and touching in swallow-flights on Piacenza, Sienna, Pistoia, and other towns. It will be a scramble, but a very happy one for those who go for the first time, and who have youth and enthusiasm as companions of their journey. By way of preparing to make the most of it the committee have organised a series of meetings at which each of the towns to be visited will be studied beforehand by the aid of books, maps, and photographs,—an excellent idea.

* A very full description and illustrations of these specimens, by the author, appeared in the *American Architect and Building News*, Nov. 7, 1885.

† To be continued.

M. EUGÈNE GUILLAUME, member of the Institut of France, who was formerly Director-General of Fine Arts, has recommenced his Cours d'Esthétique at the Collège de France, and his recent lectures on the influence of the philosophic schools of Greece in the development of schools of art have contributed to maintain the high character of that too little known educational institution. Plato and Zeuxis, Aristotle and Lysippus and Apelles, Plotinus and the artists of the Alexandrine School, have in turn served the eminent Professor with subjects for very thoughtful studies, in which he seems to have established beyond question the parallelism which existed between the philosophic doctrines and the artistic conceptions of ancient Greece.

THE publication, in facsimile, of some of William Blake's extraordinary illustrated manuscript poems, edited by Mr. W. Muir, and published by Mr. Quaritch, of which some books have already appeared, is, we hear, in process of continuation, and the works to be brought out (it is hoped) during the present year are "Milton," "Europe," "The Song of Los," and "There is no Natural Religion." We mentioned the reproduction of the "Book of Thel" some time since. The new reproductions, like the previous ones, are to be confined to fifty copies for subscribers only.

WE are glad to learn, from a letter from Dr. Villiers Stanford in the *Times* of Wednesday, that a committee has been formed for erecting a monument in Cambridge to the great composer of the "early English" period of music, Orlando Gibbons, who was born at Cambridge in 1583. Gibbons was, in his way, one of the greatest masters of "tone-structure," and his memory well deserves the honour of such a commemoration in his native place. The proposed site for the monument is opposite King's Parade, and it is proposed that it should be in the form of a statue by Mr. Hamo Thorneycroft. No fault can be found with the choice of a sculptor; but considering the unfavourable effect of the weather on open air statues in England, would it not be better to place the statue in the antechapel of King's (where Gibbons was a chorister), where it will be protected from the atmosphere, and where the composer may seem still to hear the voices winding through the vocal mazes of his own "Service in F," dear to all church musicians? The proposal to place on the pedestal a portrait in relief of Sterndale Bennett (another old King's chorister), which Dr. Stanford also makes, is unhappy, and has already been called in question. Bennett was too original a genius to be placed as an accessory on the pedestal even of Gibbons; and, besides, the art of the two men had little in common; Gibbons is Gothic, Bennett is Renaissance; for these types of art have their parallel in music, though not in the same chronological periods.

THE DISTINGUISHED AMATEUR.

"He was never suspected to love anybody, nor to have the least propensity to charity or compassion."
Clarendon.

THE amateur architect differs in kind from all other amateurs; for whereas they are content to sit at the feet of the great masters in the arts which they severally affect,—regarding with a becoming reverence achievements which they can never hope to rival,—he thinks lightly of the regular professors of art, holding them to be a stupid and infatuated race, and looking down upon them with a lofty scorn.

In assuming this attitude the amateur architect is distinctly original; for the ordinary amateur is confessedly an imitator. The Hamlet of the back drawing-room will copy even Mr. Irving's limp, and the tenor of private life embellishes with reminiscences of Mr. Sims Reeves his otherwise artless performances. But the amateur architect is above such weaknesses, and, be he what he may, he is no plagiarist. It may be at once conceded that his works bear no resemblance to those of the architect by profession; that is, when the amateur is so ill-advised as to commit himself to practical work. As a rule, he is content with the safer position of being the reputed cause of what is good in the works of others, giving out that their successes are due to his inspiration, and their failures the result of the rejection of his guidance. As a man of "words, not deeds," his position is secure, and foolish is the architect who allows himself to be drawn on to the attack. Education of a special kind and a particular experience give the amateur a clear advantage in such encounters over the student or man of business. Of the chivalrous conduct of a disputed question of art or taste he has no idea. He cannot see two sides to any question, and despises the mutual courtesies and concessions which take the edge from such contests. He gives no quarter, and, it is only fair to add, desires none. As was said of an equally distinguished predecessor, he has no "propensity" to charity, unless, indeed, it be to that spurious kind of charity which does think evil, and is very much puffed up.

He is generally rich, and a liberal cheque introduces him to committees charged with the restoration of public monuments. Once there matters quickly assume a warlike tone. He has views, which he expresses vigorously, and his views are, it appears, the only ones which sensible men can entertain. Unfortunate dissentients are dragged into the columns of the leading journal and presented with the alternative of being either rogues or fools. For such exciting word-combats he is excellently equipped, and few, indeed, can long endure the cutting east wind of his ridicule and invective. He convinces no one, it is true, but he silences all, talks the weak ones over and the strong ones down,—and comes out of every fray elate with victory and eager for fresh strife.

But "silly Samson was shorn," and the amateur architect has been known to be so imprudent as to risk his reputation on bricks and mortar. There is no example of a successful amateur architect, Lord Burlington notwithstanding; for no one can say positively whether Kent was not the real author of the works which are connected with the Earl's name. The amateur who builds is lost. All his dialectical skill avails not, nor can he persuade the world that the monstrosities of which he assumes the paternity are works of art. His strong points stand him in no stead, and the bitter tongue, the rankling innuendo, the scathing satire, are powerless against the evidence of stone walls. He shows himself as unwise in fighting architects on their own ground as they are in meeting him upon his. His discomfiture is complete, and yet it cannot be contemplated without a degree of regret, for he has redeeming qualities,—undaunted courage, and a frankness in his enmities, the virtues of an open foe. How can abilities of such an order be directed in a useful channel, or be provided with a harmless escape? Their unregulated and unrestrained exercise is plainly harmful. The daubs of the amateur painter may be torn up; the poet's verses have their immemorial use. The tuneless song dies away upon the ear and is forgotten, and one recovers in time from the depressing efforts of the amateur comic reciter. But the works of the amateur architect endure at least for his lifetime and are a weariness to all but himself. So long as he merely wastes his means on a Fonthill or such like folly the result may be borne with a patient shrug; but there have been cases in which the amateur has disfigured the designs of real architects, or, worse still, laid sacrilegious hands on the works of old. In these cases a feeling stronger than that of regret will assert itself.

Could not some island,—Coventry Island, say, or Barataria,—be placed at his disposal? He might build there to his heart's content, and no one but himself be one penny the worse. The new buildings would be removed by the next generation, and there would be no ancient ones to "translate." Failing that, there are moderately unfrequented tracts in the Northern parts of the kingdom where his doings would dismay none but the red deer, and where his hobby could be ridden without public danger.

Upon what theory can one account for the aberrations of genius? Why do men who are great in the career for which they are fitted prefer to appear so very small in careers for which they have no aptitude? The amateur architect of the period is a combatant, and has no single attribute of the peaceful and peace-loving artist. He is an anachronism, and should have been a Border baron in the good old days, the companion of "Stout Williemondswick" and "Hardriding Dick," and the rest of that pugnacious and impetuous band. In these tamer times his peculiar genius has but a limited scope, and expends itself in acrid words, digging deep into all mankind with a pen for want of a sword. Such abundant energy would be worse than wasted but for the fact that he keeps up a pother about art before a public who might otherwise not think about it at all. Although his antics have a serious side, he has added considerably to the world's amusement; and at this season of the year we extend him a reasonable measure of goodwill, although he has done all in his power to make "peace on earth" an impossibility, at least for architects.

LETTER FROM PARIS.

THE grand ball at the Tribunal de Commerce was the first of the fêtes intended to console the Parisian population in their numerous troubles. With the Christmas and New Year's rejoicings we have entered on a new phase of the programme, and the Palais d'Industrie finds itself transformed for twelve days into an immense *kermesse* of the gayest and most picturesque aspect. We pass over, as is most suitable, the concerts and theatrical performances and other attractions, to speak of the artistic decoration of the Palais. In order to cover the immense wall surface of the large nave, transformed into a winter garden, the committee asked for the loan from the State of the historic tapestries, and had the good fortune to be seconded by M. Williamson, the curator of the Mobilier National. Here was an incomparable collection of textiles of Gobelins, Beauvais, and la Savonnerie, absolutely unknown to the public, and which was in itself a sufficient attraction to the fêtes. This exhibition is an absolute revelation to the art-world, and a great source of instruction to our schools of decorative art. The artistic genius of the seventeenth and eighteenth centuries appears here in all its splendour, and one could not but ask, in looking at these tapestries of such rich and yet pure style, these compositions of such power and originality and such warm and harmonious colouring, if modern civilisation, with its mechanical achievements, was not a decadence by the side of these vigorous conceptions of the master-workers of past generations.

While these fêtes are being organised for the profit of hands out of employ, the Municipal Council of Paris is engaging in useless discussions. It is not the part of a great municipality to settle questions of wages, to limit the hours of labour, and fix the price of a day's work,—to make itself, in fact, the promoter of a State Socialism. All one can ask of them is to promote, by their votes, the undertaking of great public works, which alone can bring prosperity to the mere workman, whom Utopian theories do not affect at all.

To the oldest among these the "Union des Chambres Syndicales du Bâtiment" decreed the other day their rewards. As before, at the "Société Centrale des Architectes," we have seen the veterans of the workshop come forward and receive the consecration of a long life of honourable labour. "Let us be united, my old comrades," said the President of the Chambres Syndicales, in a hearty extempore address, "the times of hate and discord are no more,"—an optimist affirmation which is, unhappily, only the illusion of a generous nature.

Let us mention, in connexion with this subject, the exhibition organised in the Salle des États at the Tuileries by the syndicate of contractors for public works. In an epoch like our own, where the most gigantic works are undertaken without hesitation, and the impossible has almost disappeared, it is of the greatest interest to study the means employed, and the implements whereby the most difficult operations are realised.

The exhibition referred to does not include the implements themselves, it is true, but plans, drawings, photographs, and models, executed with the finish of jewellery, which permit the public to study in all their details the apparatus and their application. We may mention especially the retrospective exhibitions of implements of the last century,—a saw-mill, models of dredgers, of excavating machines, of drawbridges, and especially a model of the suspension bridge at Cubryac (Dordogne), which is a curiosity of the South of France.

On coming out from this exhibition we have ocular evidence that the work on the monument to Gambetta is in full swing. The main part of the work is already completed, and the "ornamentists" are executing the decoration of the pyramid which is to complete the groups in bronze executed after the models of M. Aubé. The monument will be placed in the centre of the Place du Carrousel. As there is also the Monument of the Revolution of 1789 to be erected on the site adjoining the Tuileries, there will be there, with the Arc de Triomphe already existing, a complication of architectural lines which may produce rather an awkward effect, especially if the Administration establishes, as is proposed, a row of porticos along the street of the Tuileries, leading from the Pont Royal to the Rue de Rivoli.

But these are only projects; there is many a slip between the cup and the lip with them. It is the same with the decoration of the Pont de la Concorde, so many times attempted, and which has again come up for discussion. Sundry journals are demanding that there should be placed on the pedestals, which cut the parapet at regular intervals, statues of the great men of the French Revolution. This would only be a repetition of what previously existed. But the former statues on the bridge produced so bad an effect that they were removed to the Cour d'Honneur at Versailles. Since then, the Commission de Beaux-Arts has vainly tried many schemes of decoration, especially that of great pylons decorated with allegorical figures. They even put in position, in 1877, models designed by Duc, the celebrated architect of the Palais de Justice; but the idea was abandoned, and we may hope that the "Gloires de la Revolution Française" will not step on the pedestals to obstruct the view of the Seine and of the monuments which border the quays.

We doubted last month, in speaking of the fêtes projected on the Pont Neuf, that the slow but progressive decay of that ancient monument would interfere with a very interesting part of M. Alphand's programme. The city engineers, it is true, maintain that the circulation of traffic can soon be re-established without danger; but the work of consolidation is not making great progress, and the demolition continues while the probable causes of the accident are discussed. Is it the rupture of the pile work or the sinking of the ground which supports the piles? Whatever it is, it is much to be regretted, on both historical and architectural grounds; for the Pont Neuf, from its antiquity, and the recollections connected with it, is one of the most interesting monuments of Paris. Commenced in 1578 by Androuet Du Cerceau, it was completed in 1604, under the direction of Guillaume Marchant. Germain Pilon ornamented it with masks of remarkable workmanship; and two eminent engineers, MM. Michal and De la Gallisserie, restored it completely in 1848. To the Pont Neuf belongs also the recollection of the Samaritaine, that once celebrated fountain whose carillon rang joyously at all public ceremonies, and especially when the king passed by. Here is a whole world of associations which will disappear unless one can fetter the destructive hand of time.

As this unforeseen event will modify certain portions of the intended fêtes, an electric installation at the Hôtel de Ville has been hastily got up, in view of a grand charity ball.

The decision has been given, a few days since, in the matter of the competitive designs for a monument to Rousseau, of which we have formerly spoken, and the situation for which was not fixed upon beforehand. Voltaire has already his statue on the Quai Malplaquais, on the left of the Institute; why not place Rousseau in the corresponding position on the right? In this way the homage would be conformable to historic traditions, and the two great men, who professed such a violent aversion to each other during life, would continue, after death, to turn their backs on one another.

M. Berthet, who missed the prize in the Étienne-Dolet competition, has obtained it in this case. His work is an honourable mediocrity. The expression is feeble, the modelling correct, cold, without any of those accentuations which give character to a work and raise it to the level of originality. The same commonplace character belongs to the model by M. Larche, who wins the second prize; and, in fact, it is the third premiated design which most attracts us. This is by M. Steiner, whose model is good and without pretention, excellent in anatomy, the draperies broadly treated, and the general effect far more vigorous than the two which have, nevertheless, been preferred.

In speaking of sculpture, we may note in passing that the statue of Claude Bernard will shortly be placed on the top of the flight of steps leading from the Rue des Écoles to the Place du Collège de France.

There has been much talk lately about the six "Old Masters" offered by subscription to the Louvre, the authenticity and artistic value of which were very doubtful. The close examination to which the conservators of the museum have subjected them has justified this instinctive mistrust, and of this "magnificent donation" the State has retained only three which are "attributed to" Crivelli, Lucas Gassel, and Fra Angelico. The others are utterly apocryphal.

We can announce the speedy opening of the Musée de Luxembourg, which forms a symmetrical *ensemble* composed of the gallery (properly so-called), of the orangery, and the two other galleries detached from it at the two extremities and abutting on the railings of the Rue de Vaugirard. Between the three blocks of buildings a space is reserved of about 7,000 square mètres, adorned with shrubs and lawns, on which are to be placed bronzes and marble statues. In this manner modern art will be "*chez-lui*," and will have no occasion to demand of the conscript fathers of the Senate a hospitality which they bestow with such a very bad grace.

One cannot address a similar reproach to the Municipal Council of Paris, which, in its rather ill-advised zeal as an inexperienced Mæcenas, is again about to lend the Pavillon de la Ville (on the Champs Elysées) to independent artists. We are threatened with an exhibition there which in a way will be interesting, and which, if it coincides with the opening of the *Salon*, will be in reality and exhibition *des refusés*.

Another exhibition now open at the Galerie des Artistes Modernes, in the Rue de la Paix, is a collection of the pictures and studies of Berchère, the remarkable Oriental artist. The collection will remain on view till the 16th of January.

In continuation of its work of popular instruction, the Administration of Paris is about to place at different points in Paris commemorative tablets to recal the existence or the death of various celebrated persons. Thus, on the Hôtel des Postes, Rue Jean Jacques Rousseau, an inscription will record that here once stood the house of La Fontaine of the fables. Other tablets will mark the house where Admiral Coligny was assassinated (144, Rue de Rivoli), and the theatre where the king's comedians (Comédiens Ordinaires du Roi) played from 1689 to 1770 (Rue de l'Ancienne Comédie, No. 14). These commemorations of the past are excellent, and we approve equally the inscription which records, on the Quai de la Conférence, the monumental gateway constructed 1632 by the architect Pidoux, and which was destroyed in 1730. We do not say so much for the revolutionary souvenirs with which the Musée Carnavalet continues to enrich itself. We may accept the sword of honour, offered by the Directory to Masséna after the Italian campaign. It recalls some national glories and the worth of a general who was surnamed "L'enfant chéri de la Victoire." But, in all conscience, is it worth while to purchase, as is threatened, the bath in which Marat was stabbed by Charlotte Corday? Apart from the question of the authenticity of this wretched relic, what interest has it for the history of France? After the fall of the Empire, the first care of the Government was to scatter to the four corners of France the museums of the sovereigns which had been laboriously collected at the Louvre. There were among this collection remarkable works of art and very curious relics. The Republican press, Heaven knows, has been lavish enough of its sarcasms about the trappings of the monarchy, the perruques of Louis XIV., the "fichus" of Mary Antoinette, the little hat and legendary grey overcoat of Napoleon; and here are the same kind of vagaries beginning over again without even a shrug of the shoulder: only for the relics of monarchies it is found suitable to substitute a revolutionary frippery, which has not even the attraction of rarity or curiosity. So true it is that in France we keep turning always in the same circle, with the regular routine of a horse in a training yard.

We have again two deaths to register in an artistic obituary. M. Joseph Beaume, historical painter, who has died at the age of eighty-nine, was author of many military pictures at the Versailles Galleries. He was a pupil of Gros, and obtained a second medal in 1824 and first medal in 1827. One of his principal works was a picture exhibited in 1822, representing the death of Henri III. He was born in 1796. The architect Labrouste, who is dead at the age of eighty-six, as already mentioned in the *Builder*, was a pupil of Vaudoyer and of Hyppolite Lebas. He gained the "Grand Prix d'Architecture" in 1827, and in his later years filled the situation of the Arsenal and of the Collège Ste. Barbe, of which his brother had been the director.

We have mentioned that M. Chaplain, the eminent engraver, had been commissioned by the Municipal Council to execute a model for a medal commemorative of the Hôtel de Ville. This medal, which is to be presented to the President of the Republic, the members of the Parisian Municipality, and the principal functionaries, bears on its front face a seated figure personifying the City of Paris, and pointing towards the imposing perspective of the new palace. On the reverse, an inscription surrounded with leaves of laurel, gives in relief the names of the two architects of the Hôtel de Ville, MM. Ballu and Deperthes. These two architects were equally winners of the first premium in the competition, and shared equally the premium, although for the more systematic carrying out of the building it was thought necessary to name one of them, M. Ballu, architect-in-chief. The inscription engraved by M. Chaplain on the reverse of the medal is, therefore, only the legitimate expression of the union of these two architects in a common work, which will remain one of the most remarkable of its age.

Illustrations.

THE NEW HÔTEL DE VILLE AT NEUILLY.

IN Paris, as in London, the current of population sets towards the west. While the southern and eastern quarters of the city remain stationary, the diametrically opposite *arrondissements* are spreading up to the fortifications, and only await the inevitable abolition of those useless ramparts to extend still further towards the setting sun. This fact alone explains the enormous impulse given during the last ten years to the surveying and building in the 17th arrondissement, in consequence of which the present magnificent quarters which cover the plain of Monceaux have risen from the earth, and this is also the reason why Neuilly-sur-Seine, the most Parisian of all the suburban communes, grows more beautiful, more populous, and more extensive every day. The proximity of Paris and of the Bois de Boulogne, the multiplicity of the means of transport, the shady boulevards bordered by elegant villas, have made this pretty suburb into an aristocratic faubourg, and the chosen centre of a numerous foreign colony, in which the English element predominates.

Menaced by its situation itself with future annexation, Neuilly, which by no means intends to be incorporated with Paris, has from its own resources, and as a kind of protest, raised a town-hall of an importance far exceeding that of other similar monuments in the suburban zone.

The well-proportioned façade of this town-hall is to be seen in the Avenue du Roule, in the very heart of the Commune. The edifice, which was opened in September last, was, in 1879, the subject of a public competition, in which more than sixty competitors took part. The winner, M. G. André, a pupil of M. Questel's, not being able, in consequence of other engagements, to leave Lyons, where he practises, to come to Neuilly to personally take charge of the work, was replaced by MM. Dutocq and Simonet, who, while respecting the grand outlines and proportions of the façade of the premiated design, were happily inspired to increase its decorative value by various and skilfully-devised additions.

The principal façade, which is 40 mètres (about 130 ft.) long, comprises a centre portion raised on a flight of ten steps and flanked by two great angle pavilions. Three semicircular

arches, filled with wrought-iron grills, give access to the interior and are separated by niches intended to receive statues.

The simplicity of the lines of the ground-floor give value in a happy way to the architectural richness of the upper part, which consists of a Corinthian order, between the columns of which are rectangular mullioned windows. This colonnade supports a frieze, magnificently carved by E. Barrias, the whimsical bas-reliefs of which, consisting of children playing among foliage, surround the angle pavilions for a length of 70 mètres. Above is a balustrade, and in the middle of it a clock, which M. Tony Noël has ornamented with two recumbent statues representing the rights and duties of man. On the right and left of the dial are two elegant figures carved by the same artist and symbolical of Day and Night. Of these sculptures we give a separate illustration on a larger scale. Owing to their elevated position it was impossible to get a photograph of the actual work as completed, and our engraving has been made from a photograph of the original model in clay. This was not entirely finished in all details, some of the lesser details being only roughly indicated, but the figures were complete as here shown. Rising above the centre of the roof behind the clock is a turret, 42 mètres high from the ground, and evidently inspired by that of the Hôtel de Ville at Paris.

Mansard roofs surmount the angle pavilions, which are decorated in three distinct ways: in the lower part allegorical bas-reliefs, by M. Charles Gautier, crown tablets intended for the posting of public notices. At the first-floor level composite pilasters flank a large mullioned window, the projecting balcony of which is carried by consoles; above the cornice rises a dormer, with a triangular pediment ornamented with little vases at the angles and on the apex.

The sides of the building are extremely simple. Three tiers of windows (round-headed on the ground-floor, rectangular and with projecting balconies on the first floor, and dormers in the roof) form the only decoration. On the rear façade appear again, with a sobriety that gives further value to the richness of the principal one, the arrangements which we have described, with a central portion facing a large court recessed between two wings which form the pavilions.

The interior of the building is equally well arranged for administrative purposes and for public ceremonials. After mounting the flight of steps at the entrance, one penetrates into a large vestibule decorated with Composite pilasters, and out of which rises a staircase of white stone, the straight, parallel steps of which lead to the reception rooms on the first floor. There one finds the staircase surrounded by a gallery, square on plan, the open balustrade of which is broken symmetrically on each face by the pedestals of a great semicircular arch. The piers of this arch, which is ornamented with deeply-cut carving, are pierced, each with a smaller opening flanked by pilasters supporting a cornice which receives the transverse arches of the vault. This arrangement is reproduced on the side walls, with blank arcades flanked by rusticated Ionic pilasters. Above is a frieze, decorated with escutcheons, fruit, and interlacing figures.

The gallery is paved with Venetian mosaics, executed by M. Facchina. It gives access at once to the offices of the *État Civil*, to the private room of the mayor, and to the *salons*, the largest of which occupies the whole of the first floor along the principal façade. It is entered by three doors, with moulded architraves, surmounted by pediments, each with a cartouche and a very rich frieze. This *salon* has two large chimneypieces and high wainscoting, the panels of which are decorated with escutcheons, with a monogram composed of an N and two S's interlaced (Neuilly-sur-Seine), which occurs also on the escutcheons of the façade and on the door-handles.

The *Salle des Mariages*, situated in the pavilion on the left of the façade, is decorated with a marble bas-relief by M. Gaudez, symbolical of the family. Here the arrangements made by the architect show evidences of the influence of the feeling of the times; for this apartment is terminated at one end by a great arch draped with curtains, which give to the platform occupied by the mayor a false resemblance to a Jewish Tabernacle, and the effect of a "lay sanctuary" well calculated to rejoice the hearts of the apostles of free thought.

The other pavilion, reserved for the sittings of the Municipal Council, plays at Parliament *au petit pied* with its semicircular ranges of tables and seats, its raised desk for the President, and even its public gallery, open to all the idlers of Neuilly. This *salon* contains another bas-relief by M. Gaudez, symbolising the Republic. Let us add that the architects have had the rare good fortune to fall in with a carver, M. Ledru, of the highest talent, who has devoted himself to the work and has decorated the architraves of doors and windows, the arches of the staircase, the cartouches of the façades, and even the chimney-stalks, with carving distinguished by an originality inspired by the best periods of the French Renaissance. One could not too highly praise the finish of all the details of this harmonious building, both within and without.

Thanks to the talent of the architects, to their experience, and the prudence with which they have realised the original project of M. André, the carrying out of the work has not been attended with any of those frequent miscalculations of which municipalities complain, and the total cost has not reached a million and a half of francs, or about 1,200 fr. per superficial mètre.

In this figure, it is true, is not included the pictorial decoration of the *salons*. The reception-rooms, as well as the ceiling of the staircase, offer grand surfaces, well calculated to tempt the brushes of the best artists. Here is matter for important decorative work which the Conseil Général de la Seine will shortly be called upon to give commissions for, either after a public competition or without one. We do not hesitate to say we should prefer the latter mode of procedure.

R. B. FENWICK.

SCULPTURE, GENERAL POST OFFICE, SYDNEY.

THIS group of sculpture forms the decoration of the principal entrance to the new Post-office buildings at Sydney, New South Wales, of which Mr. Jas. Barnet, the Colonial Architect, is the architectural designer. The group here given, however, has been executed in London by Signor Giovanni Fontana. It represents a seated figure of Her Majesty in her robes as Queen and Empress, while beneath are allegorical figures representing Britannia and New South Wales clasping hands.

The group is engraved by Mr. J. D. Cooper, from a photograph.

"CHURCH AND STATE."

THOSE who have visited the ancient towns of the Low Countries and of Northern Germany must have been struck by the way in which the great ecclesiastical and secular buildings are grouped together. On one side of the great square, or principal street, we find the noble cathedral, or collegiate church, the home of piety and religion, on the other we see the great secular building of the town, the "Palais de Justice," the "Hôtel de Ville" or the "Rathhaus," representing the dignity and authority of the secular power. There can be little doubt that it is by no mere accident that these two edifices are so closely associated, and that they were to a great extent intended as a comment on those words of Scripture, "Render under Cæsar the things that are Cæsar's, and unto God the things that are God's."

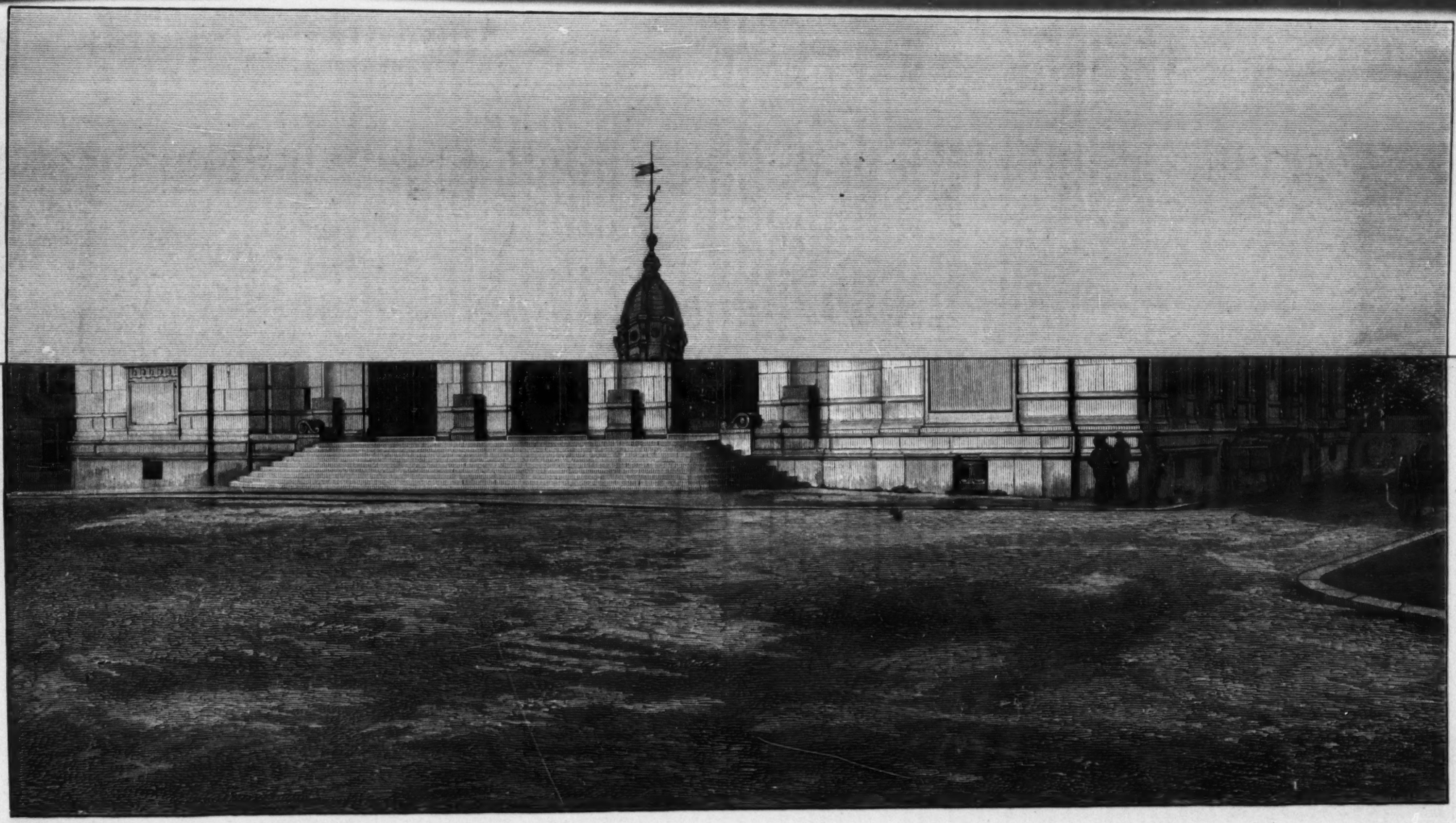
In such times as the Middle Ages, when men were more deeply impressed by external objects than they are in our days,—when an appeal was made directly to the mind by the visible creations of art, by stately buildings, pictures, and sculpture, rather than by books, which few then possessed, or could have read if they had possessed them,—these kinds of association had an immense effect upon the imagination, and did much for the cause of religion and social order.

We are too much in the habit now of regarding such aids to sentiment as somewhat puerile and childish, and of looking upon our mediæval ancestors rather in the light of grown-up babies than as reasoning and sensible men, but it may be doubted whether we have not sacrificed to mere commercial interests those fascinations which noble and dignified art has at all times exercised over the imagination. This is very obvious when we visit any of our English manufacturing towns, for in them we find little that is poetical or attractive to the imagination. We are, however, beginning to see that, after all, beauty and poetry are two necessities of the happiness of human beings, and that man does not exist merely for the purposes of money-making, that there are other things to be thought of besides the commercial prosperity of the community No one, for instance, can read the description of a manufacturing town given by Charles Dickens in "Hard Times" without a feeling of pity for the human beings whose daily life is passed amongst such appalling hideousness, and a detestation for the men who grow rich upon the toil of the wretched inhabitants, and who, by indifference and selfishness, condemn them to an existence amidst such unlovely surroundings.

A prospect of better things seems to be in view, and the many handsome new town-halls, municipal buildings, museums, picture galleries, exchanges, &c., which are rapidly growing up in such towns as Liverpool, Birmingham, Leicester, Sheffield, and Preston, together with the proposal to erect a stately cathedral in Liverpool, show how much we are in advance of our fathers in this respect. Still more, however, will be required, and greater sacrifices be demanded if the future generations of Englishmen are to become contented, and are really to enjoy the wholesome pleasures of life. We must not only put up handsome buildings in our towns and cities, but those buildings must be erected upon important and noble sites, not hidden away in back streets; and this, no matter what the cost of obtaining such sites may be. The fact is that all our manufacturing towns require to be thoroughly remodelled; they ought to be, and must be, made dignified and magnificent. Why should our manufacturing towns, with fifty times the wealth ever possessed by Ghent, Bruges, Liege, and Louvain, be more remarkable for squalor and ugliness than for grandeur and magnificence?

Unfortunately, our old English cities, beautiful as they often are, do not offer us many examples of municipal or commercial architecture, and the English cathedrals are, in nearly all instances, cut off from the towns by their great "closes." Now, superb as this arrangement undoubtedly is, it is one that is impossible to copy at the present day. The ancient English municipal buildings are small, and too unimportant for our present purposes, consequently that proximity and grouping together of vast secular and ecclesiastical edifices, which forms so notable a feature in many Continental towns, is not to be met with in this country; and in order to see what can be done in this way we are obliged to study the Flemish and German cities of the Middle Ages.

The Flemings were, like ourselves, a busy, thrifty, commercial people, not given in any way to highly poetical imaginings, or even to a love of art for its own sake; they were, moreover, an extremely practical people very fond of money, and strongly objecting to part with it: they were perhaps the very last people in Europe whom we should have expected to have made great sacrifices in the cause of art, or to have allowed their convenience to "play second fiddle" to picturesqueness or elegance; yet they saw the necessity of rendering their towns fair and pleasant homes of industry, and considered it more wise to make them attractive than disgusting and repulsive. It never entered into the mind of a Fleming that a human being could, by any possibility, exist in a place which was only remarkable for dinginess, dirt, and hideousness; and because a man's life was spent in toil and labour, they considered that the surroundings of that toil and labour should be as little repulsive as possible, and that he should enjoy as much of the social decencies of existence as was possible under the circumstances. The consequence was this, that with the most unpromising circumstances they produced such painters as Memling, Van Eyke, and such musicians as Roland Lassus (Orlando de Lasso), and Giaches de Wert, and all their numerous followers. They had their own school of architects, sculptors, and glass-painters, to say nothing of poetry and romance-writers, and thus, notwithstanding their somewhat boorish manners, unattractive external appearance, and habits of turbulence, they have left the world a legacy of poetry, music, and the fine arts second only to that of Italy. Does not this point out to us that, if we want our factory hands, and labourers, the British "*proletariat*," and even the British rough, to become valuable member



NEW HÔTEL DE VILLE, NEUILLY, PARIS.

Designed by M. André, Architect; Executed under the Superintendence of MM. Dutocq and Simonet, Architects.

of society, and to benefit the human race by their existence, we must surround them with objects that are humanising and impressive, instead of with repulsive hideousness, dinginess, dirt, and draggletail? If we do not give our working man the decencies of existence he is certain to console himself with the indecencies, and the wonder is not that he is occasionally given to habits of intemperance, but, with his dismal surroundings, that he is not in a state of perpetual intoxication; and the more his mind is improved by education the more unendurable must be his disgust with these things and the greater the temptation to blot them out by oblivion and insensibility. We have given the working classes political independence and education, but these will not add to their happiness and contentment unless they are surrounded by those objects which educated men require as food for their minds. Good taste is to a great extent the result of education, but it simply adds to a man's misery to be able to appreciate the squalour which surrounds him without having at the same time power to alter or amend it.

Our drawing is purely a composition, none of the buildings being copied from any existing edifices; though the "Palais de Justice" in general arrangement follows the type common amongst secular buildings in the low countries, and is in the style of the latter part of the fourteenth century. The portion of the cathedral or church shown is supposed to be a western porch with a triangular projection over it, somewhat similar to the end of the north transept at Erfurth, though in this case the porch itself is not triangular. H. W. B.

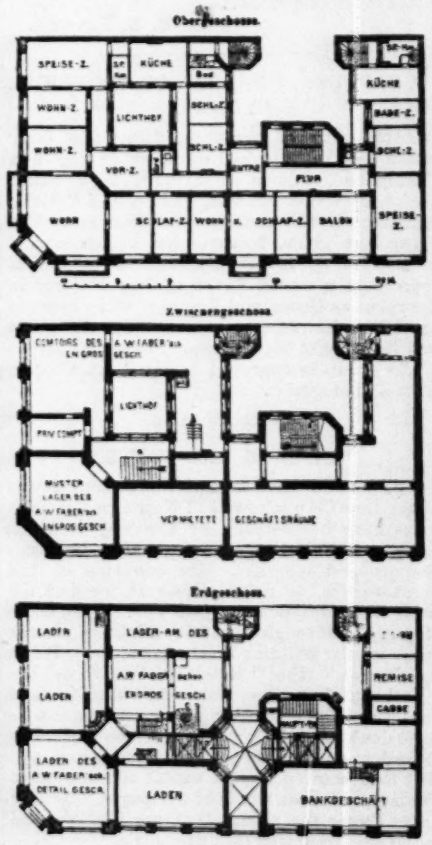
WHITEHALL COURT.

WE illustrate this week a view of the important block of buildings now advancing above the Embankment Gardens on the large site bounded on the east by the Public Gardens facing the Victoria Embankment, on the north by Whitehall-place, and on the west by a new avenue which will lead from Whitehall-place into Whitehall-yard and thence into Whitehall and opposite the Horse Guards.* The house at the corner of Whitehall-yard, occupied for so many years by the family of Lord Carrington, will be pulled down, and the site thrown into Whitehall-yard, thus forming a wide and grand approach to the new street to be called Whitehall-avenue. In order to form an approach from this new road direct on to the Embankment, a Bill is now before Parliament for the purpose of taking Lord Gage's and other houses, and forming the Horse Guards-avenue. Whitehall-court will adjoin the new National Liberal Club, which is shown at the right hand of our illustration, but in the design of which some modifications have been effected by the architect, Mr. Alfred Waterhouse, the two buildings in fact completing the façade shown in our illustration. The architects of Whitehall-court are Messrs. Archer & Green, whose plans provide suites varying from seven to twenty rooms. Each suite will be inclosed within itself; every suite will have a distinct front entrance, and, in fact, except that every four suites will be entered from a common landing, they will virtually be separate and complete houses, as distinct as if they were standing side by side with each other in a West-end street. The mansions will be eight stories in height, including the basement, and the Court will be divided into six blocks, each with a front entrance opening upon a central hall. All the tenants, of course, will have access to the terrace. There will be three classes of suites, and the rents will range from 300*l.* up to 800*l.* a year, the accommodation given for the latter sum consisting of two entire floors on the first and second stories. From an "Approximate Estimate of Rentals" we learn that for sets of suites on one floor, comprising an entrance vestibule, a hall 19 ft. 6 in. by 10 ft., a dining-room 25 ft. by 15 ft., a drawing-room 20 ft. by 16 ft., one bedroom 23 ft. by 11 ft. 6 in., two bedrooms 14 ft. 6 in. by 11 ft., a servant's bedroom 10 ft. 6 in. by 6 ft., a kitchen 14 ft. 6 in. by 8 ft. (opening upon a service-room), a bath-room 14 ft. 6 in. by 7 ft. 6 in., &c., all the rooms being 10 ft. 6 in. high, the rental will probably be, on the ground-floor, 400*l.*, on the first and second stories, 500*l.*, on the third and fourth stories, 400*l.*, and the sixth, seventh, and eighth stories, 300*l.* per annum. The whole of the buildings, including the staircases, will be built of fire-resisting materials, the floors being specially designed to prevent the transmission of sound from one occupation to another. The elevators will be of such construction as to ensure absolute safety in their working. The several façades will be of Portland stone, and the roofs covered with green slates.

* For general plan of the site, see the *Builder* for Dec. 5, 1885.

STREET ARCHITECTURE, BERLIN.

UP to the year 1870, while Berlin was the capital only of Prussia, modern architecture was completely under the influence of the Academy, an institution for the instruction of the official architects of the Prussian State, in which the pupils were exclusively taught the fixed principles and cut-and-dried rules of Classic architecture, as formulated by Schinkel. The consequence was a succession of public and private buildings destitute of originality, which, albeit professing to be imitations of Schinkel's learned and often refined work, were calculated to bring the whole school of Berlin architecture into discredit. Especially harmful was the indifference displayed with respect to the treatment of material, and the complacency with which the immortal forms of Classic architecture, generally of the age of Pericles, were reproduced in characterless and perishable stucco work. Prussian infallibility overlooked the fact that the architectural schools of the other German capitals, — Vienna, Munich, Stuttgart, Dresden, and Hanover,—were encouraging a careful study of the architecture of



the Middle Ages and the Renaissance, and were making this study the foundation of a more novel and more suitable modern style.

The year 1871 introduced a change for the better. The elevation of Berlin to the capital of the German Empire roused fresh activity in the architectural world, and money being more abundant, architects were enabled to give the reins to their imagination and taste. Now, also, the efforts of the other German schools served as an impetus to that of Berlin.

It was impossible for the Government to remain quite unaffected by the spirit of progress displayed in architecture not designed for the State, and the first official step in the same direction was taken by a complete reorganisation of the Academy, the course of study now comprehending the architecture of the Middle Ages and the Renaissance, under the guidance of such masters of the subject as Otzen, Schäfer, Ende, and Raschdorff.

It must be remembered also that the position of Berlin in the empire had brought to the capital many highly-accomplished architects, and thus we cannot wonder that at the present moment a long list of candidates for fame are arrayed against each other, and although, as we have already remarked, their artistic impulses take the most varied form, they are at one in their desire to build what will last, and to take into account the materials with which they have to deal.

The illustration which we give this week affords a good example of the new tendency in Berlin architecture. It represents the business premises of the well-known Nüremberg firm of drawing material manufacturers, Messrs. A. W. Faber, and was the successful design in a competition set on foot by Baron von Faber among the members of the Society of Architects in Berlin. (We append plans of three of the floors of the building). The architect, Herr Grisebach, belongs to the Hanoverian School, but worked for several years in Vienna under Friedrich Schmidt, and designed a number of private houses in Wiesbaden and Coblentz before settling in Berlin. His style has been largely influenced by his study of German and Belgian works of the sixteenth century. Hence we have a free and judicious architectural treatment, producing a rich yet unobtrusive effect, in striking contrast to the pedantic style to which an exclusive devotion to Classic models infallibly leads.

DESIGN FOR STAINED GLASS: "THE RETURN OF ALSACE AND LORRAINE."

THIS design, by M. Wagrez, is the one referred to in "Our Letter from Paris" of Nov. 7, 1885, in the description of the stained-glass exhibits in M. Champigneulle's room at the "Exhibition du Travail" held at that period in the Palais d'Industrie. Our able Paris correspondent, in sending us a photograph of the cartoon, expressed his regret at the use of art for the expression of political feeling, with which art has really nothing to do. We concur in his opinion; but the whole design is so spirited, and the group representing France and the two provinces,—the mother-country receiving back her daughters,—is so expressive and so admirably composed, that we believe all our readers will concur with us in thinking the design well worth publication.

THE FORTH BRIDGE.

WE give in this number a series of illustrations of the making and launching of the caissons for the foundations of the piers of this immense work, and two sheets of the working drawings of the iron work, all which are reproduced from drawings made in the engineer's office, and kindly lent by Mr. Baker for this purpose. We give also a small view of a portion of the bridge as it will appear when completed, along with the adjoining coast; this is reproduced from a photograph of the site, upon which the bridge has been drawn to the proper scale, in order to convey an idea of its magnitude in reference to the surrounding country, in which respect it casts into the shade any other engineering work of modern times; and this view will enable readers to understand the complaint which Mr. Baker informed us was made against him by an inhabitant of the district, who objected to his coming there and "dwarfing the hills."

Some of the principal practical details we extract from one of several papers on the design and construction of the bridge, read by its engineer before those who were desirous for detailed information in regard to it.

"Five tenders were submitted for the construction and erection of the bridge, the amounts varying from 1,487,000*l.* to 2,301,760*l.*, and the contract was finally let to Messrs. Tancred, Arrol, & Co., on the 21st of December, 1882, for 1,600,000*l.*, which was within 5,000*l.* of the estimated cost of the work, as prepared by Mr. Fowler and myself for Parliamentary purposes.

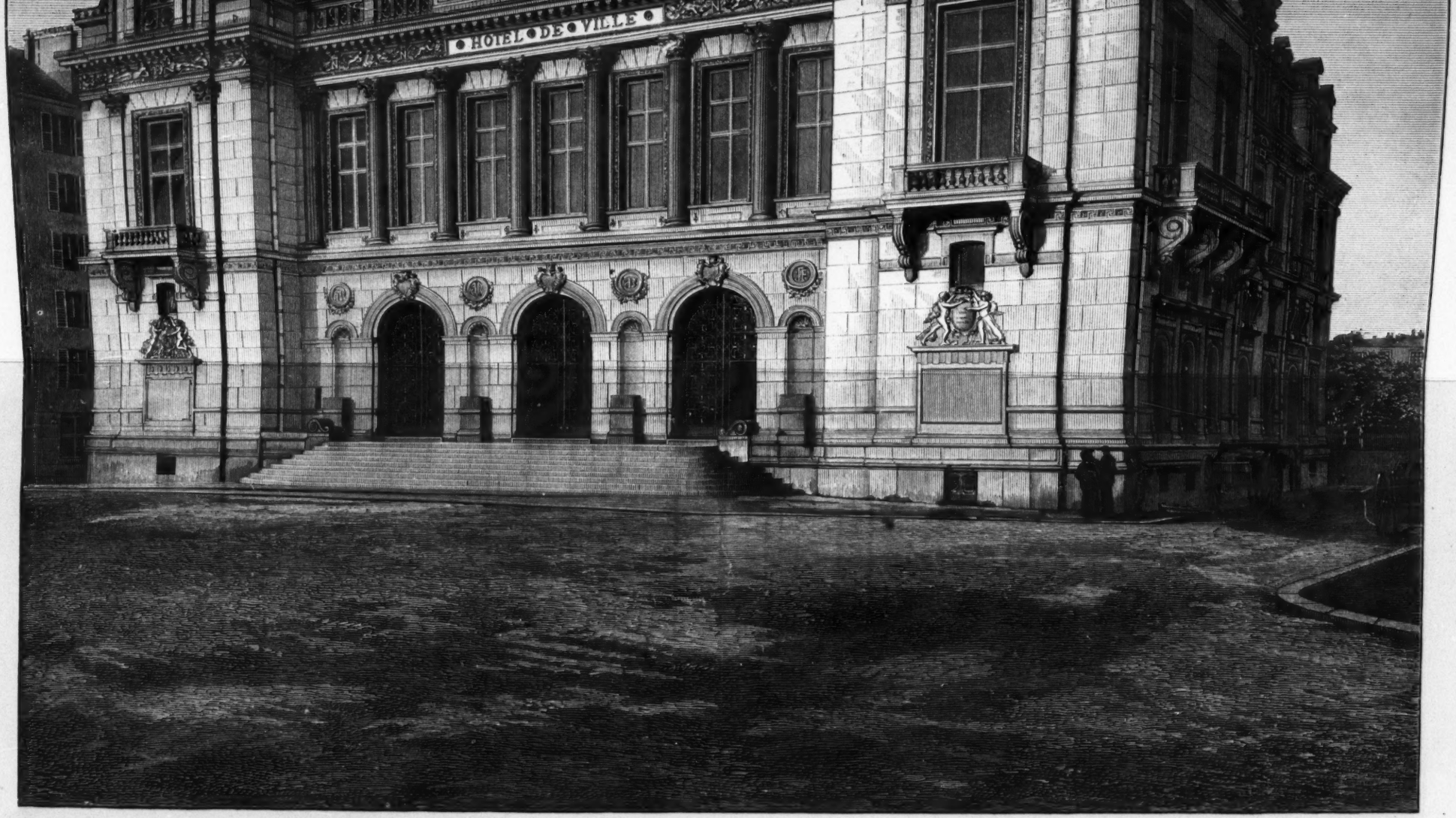
The total length of viaduct included in this contract is about a mile and a half, and there are:—

2	spans of 1,710 ft.	each.
2	,, 675	,,
15	,, 168	,,
5	,, 25	,,

Including piers, there is thus almost exactly one mile of main spans, and half a mile of viaduct approach. The clear headway under

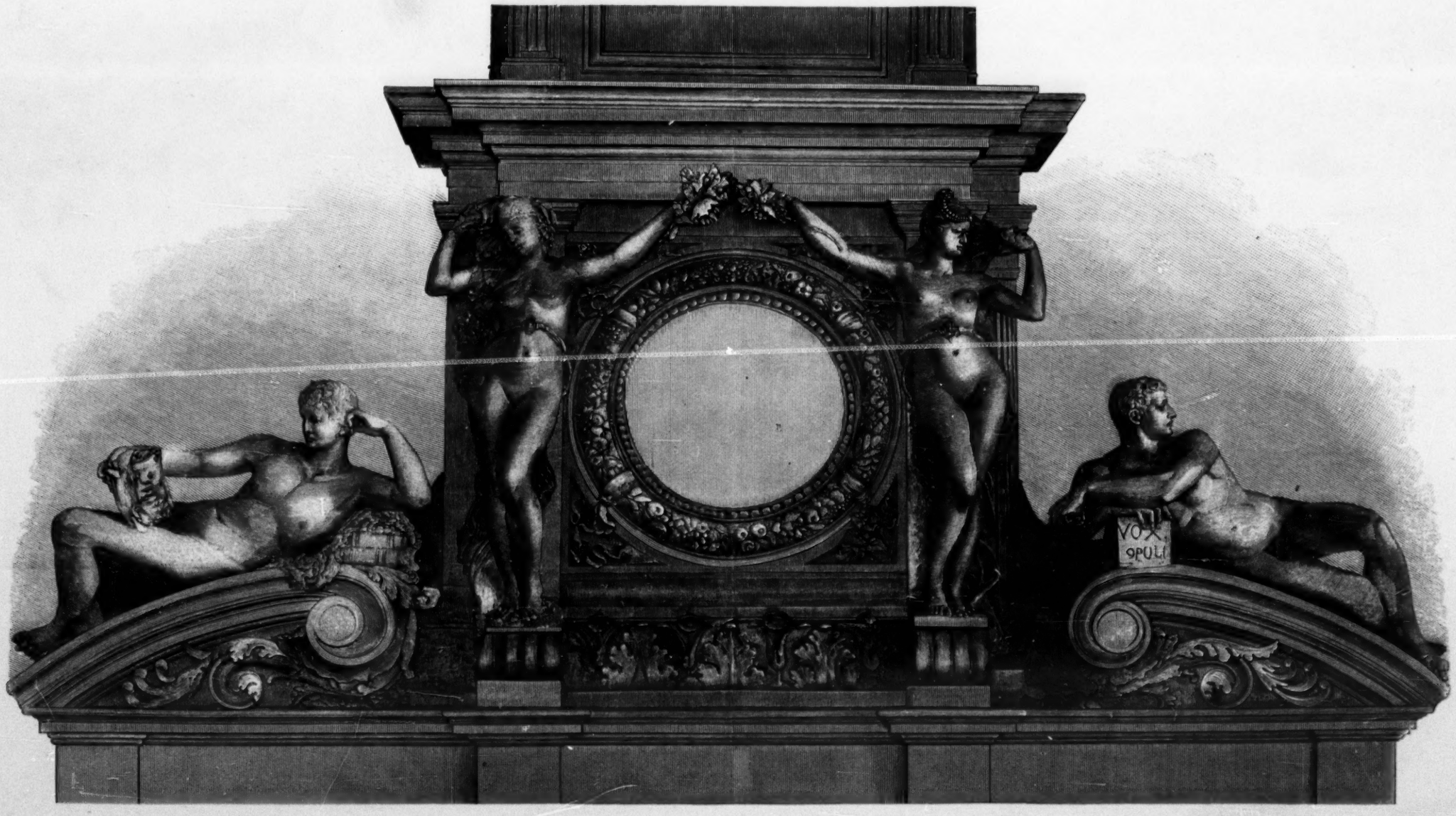
THE BUILDER, JANUARY 2, 1886.

HOTEL DE VILLE



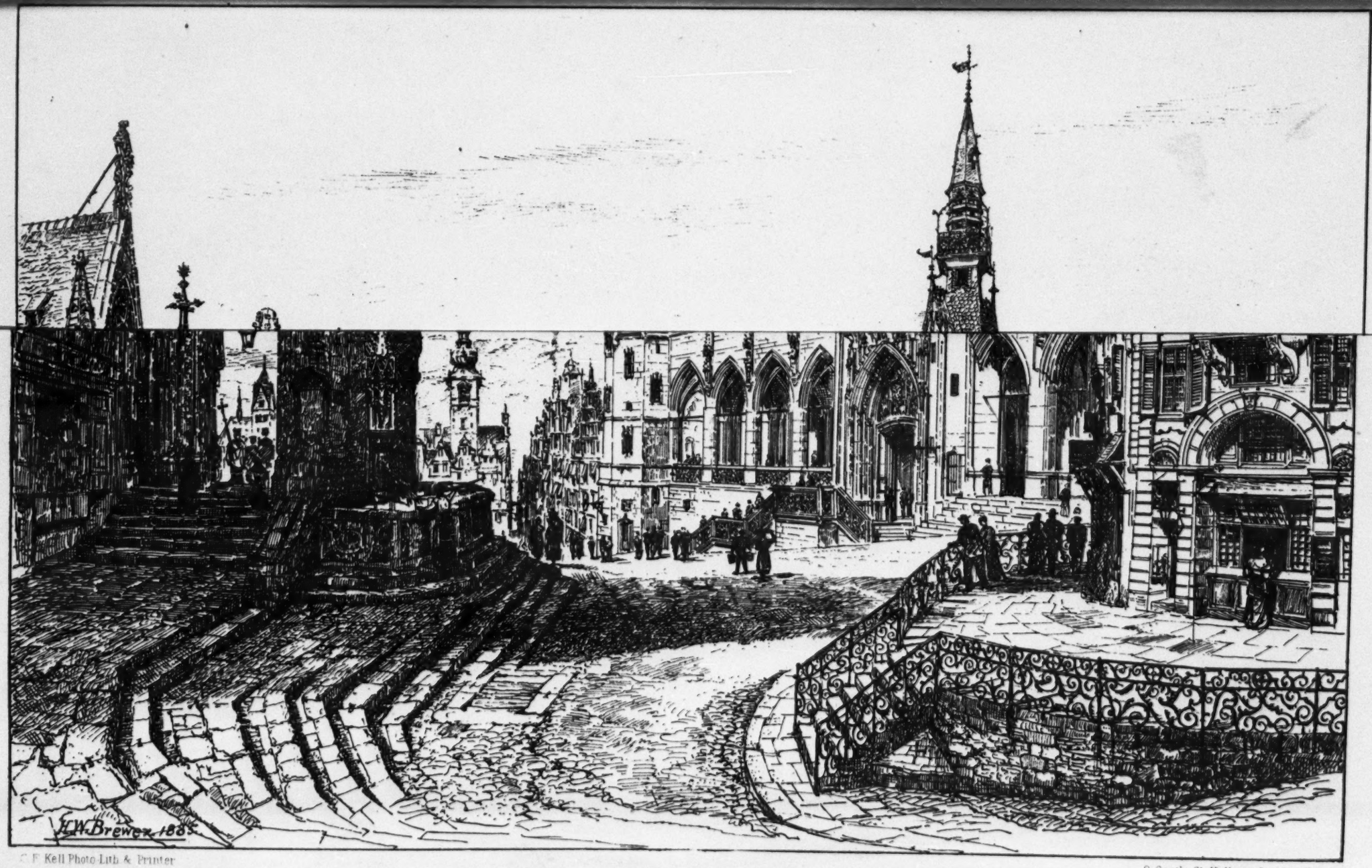
NEW HÔTEL DE VILLE, NEUILLY, PARIS.

Designed by M. André, Architect; Executed under the Superintendence of MM. Dutocq and Simonet, Architects.



SCULPTURE, NEW HÔTEL DE VILLE, NEUILLY, PARIS.—M. Tony Noël, Sculptor.

(Engraved from a Photograph of the Clay Model, taken in the Sculptor's Studio.)

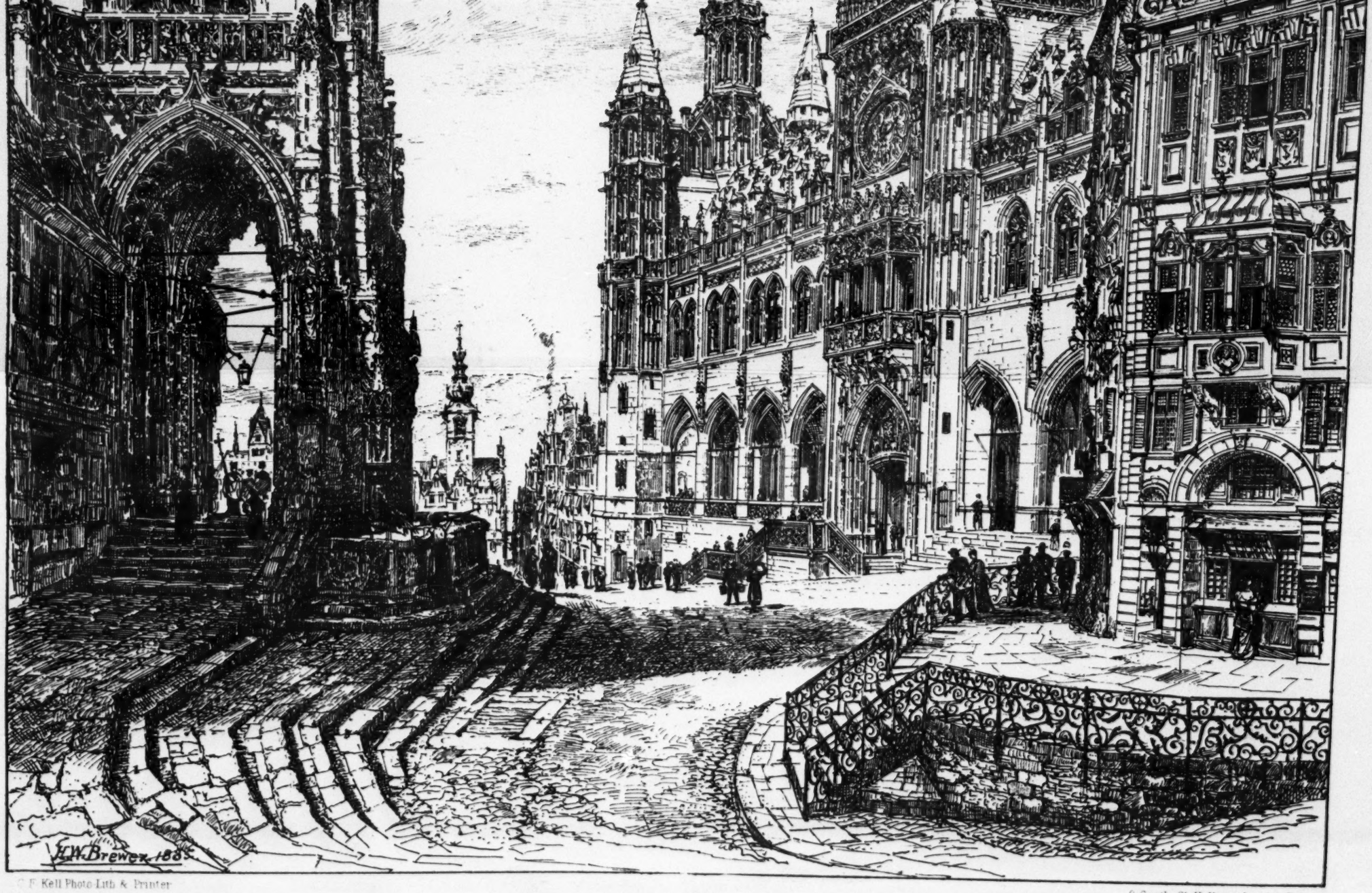


C. F. Kell Photo-Lith & Printer

8 Castle St Holborn London E C

CHURCH AND STATE, DRAWN BY MR. H.W. BREWER.

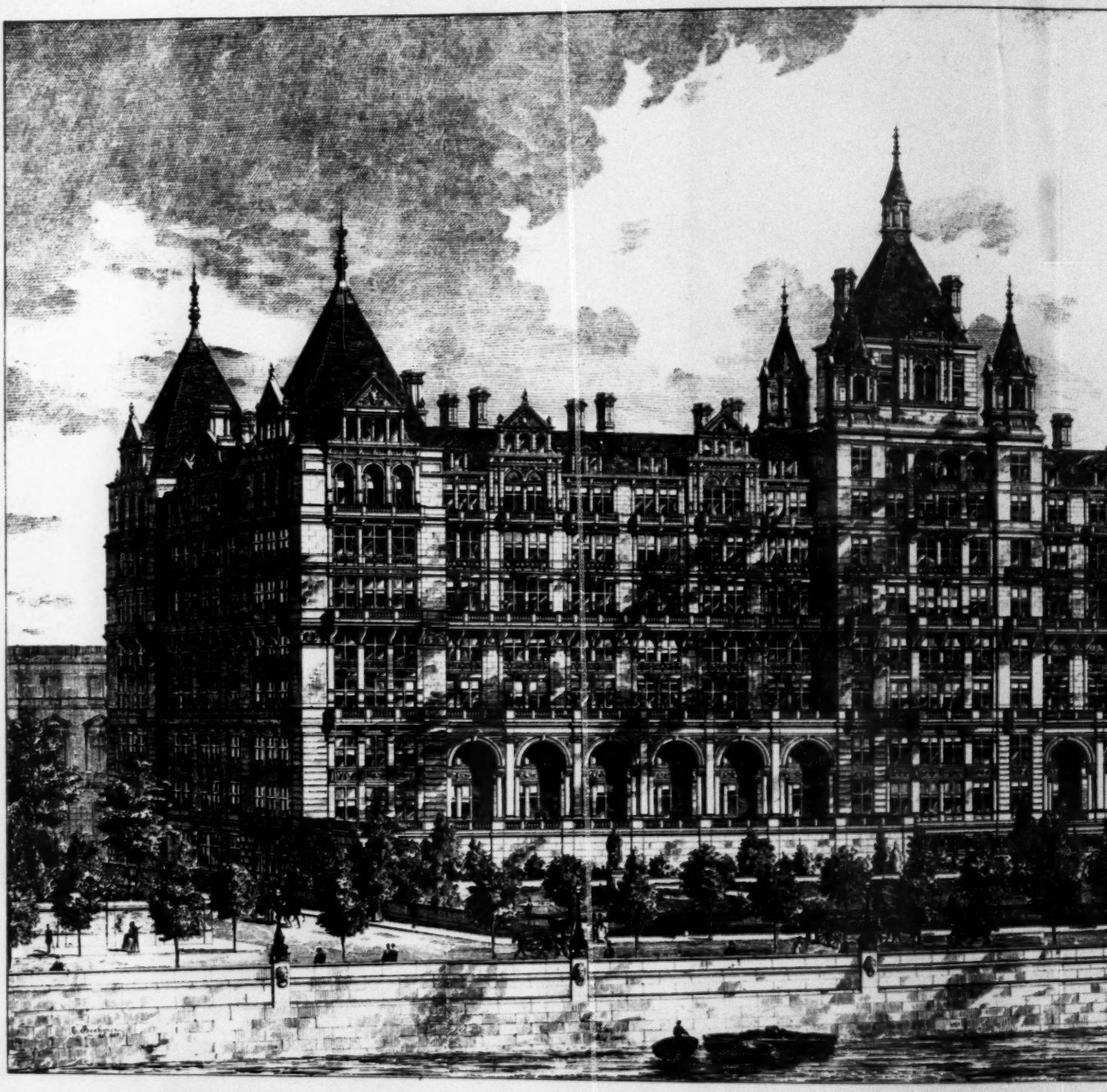
(Illustrated from a Photograph of the Only Relic, taken in the Temple's Studio.)



C. F. Kell Photo-Lith & Printer

8 Castle St Holborn, London E.C.

CHURCH AND STATE, Drawn by Mr. H.W. Brewer.



WHITEHALL COURT: VIEW F

MESSRS. ARCHER AND GREEN

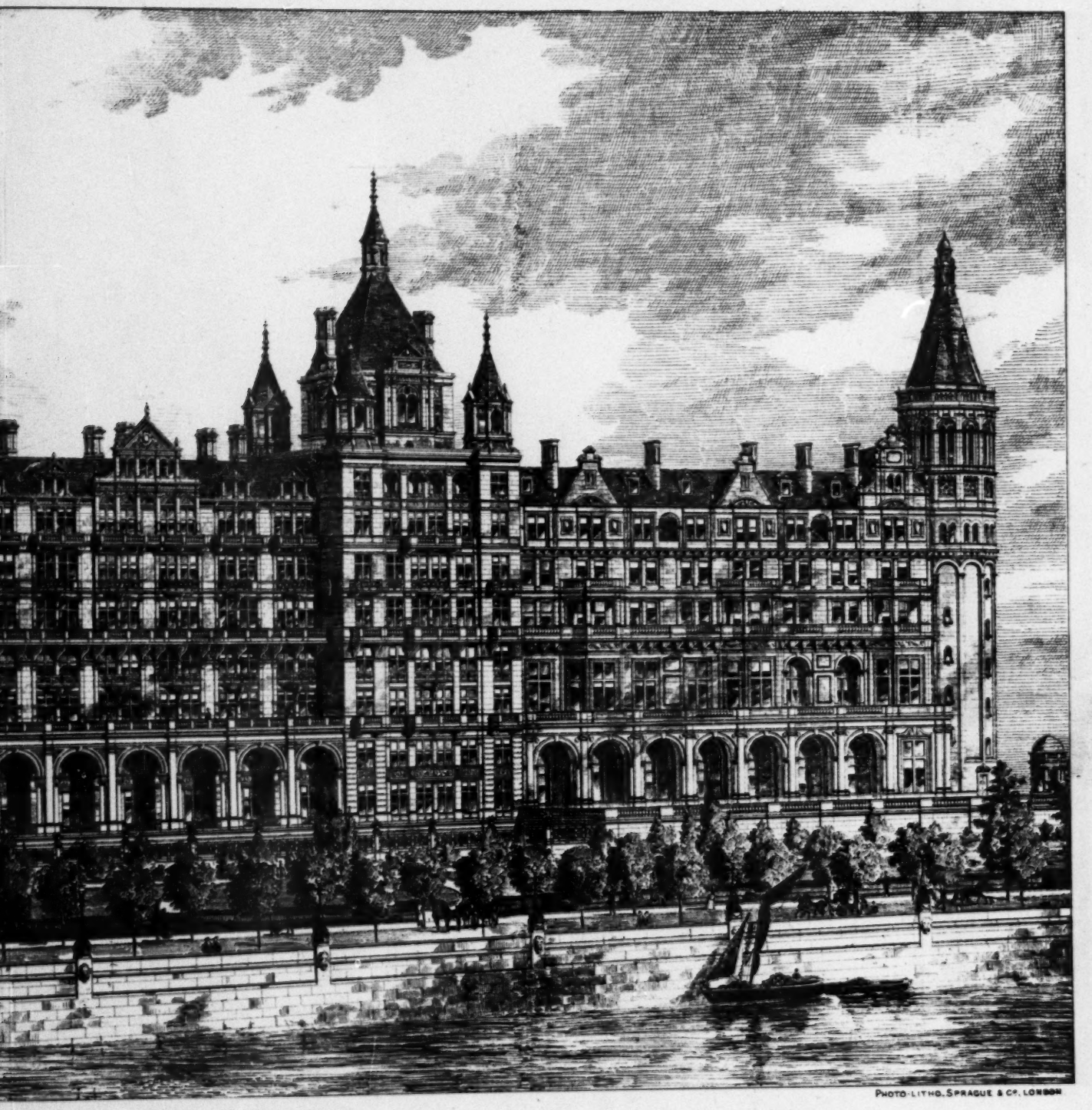


PHOTO-LITHO. SPRAGUE & Co. LONDON

IEW FROM THE RIVER.

GREEN, ARCHITECTS.

SCULPTURE OVER ENTRANCE OF GENERAL POST OFFICE, SYDNEY, N.S.W.—SIGNOR GIOVANNI FONTANA, SCULPTOR.

SCULPTURE OVER ENTRANCE OF GENERAL POST OFFICE, SYDNEY, N.S.W.—SIGNOR GIOVANNI FONTANA, SCULPTOR.

INK-PHOTO. SPRAGUE & Cº. LONDON.

STREET ARCHITECTURE, BERLIN.

PREMISES ERECTED FOR HERR A. W. FABER.

HERR GRISEBACH, ARCHITECT.

THE RETURN OF ALSACE

DESIGN FOR STAINED GLASS

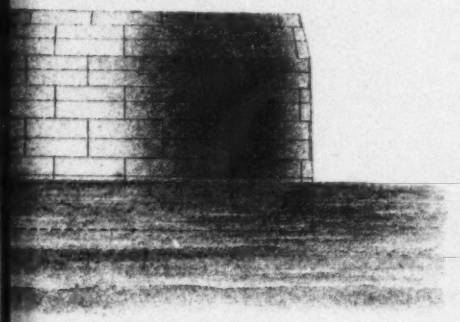
Exhibited at the Exhibition du Travai

INK PHOTO. SPRAGUE & Cº. LONDON.

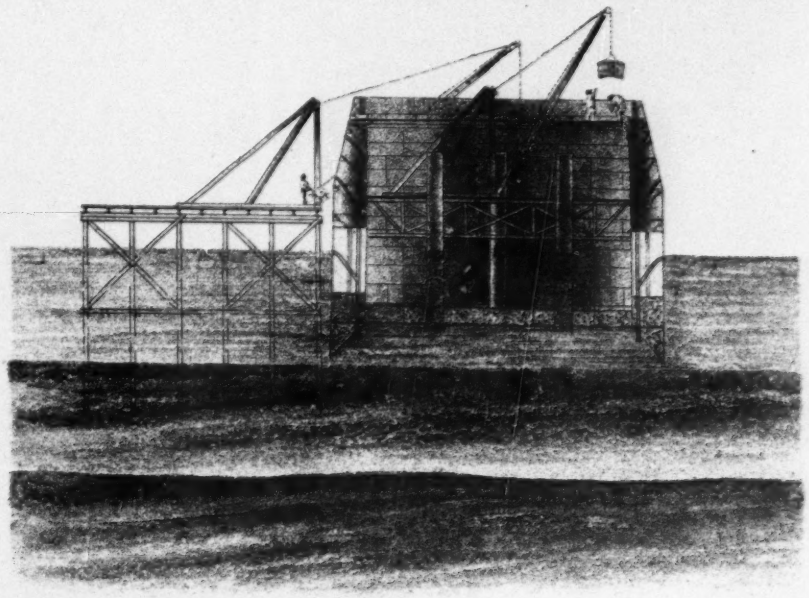
SACE AND LORRAINE.

GLASS BY M. WAGREZ.

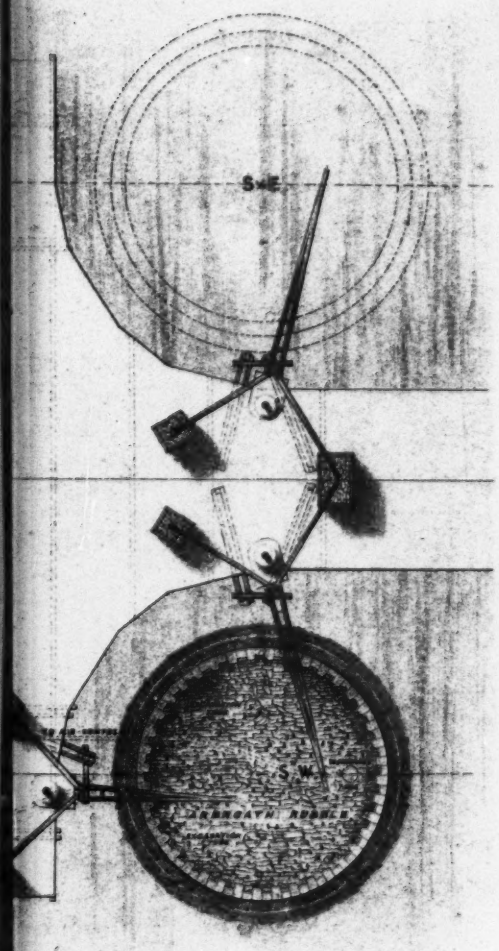
Travail, Paris, November, 1885.

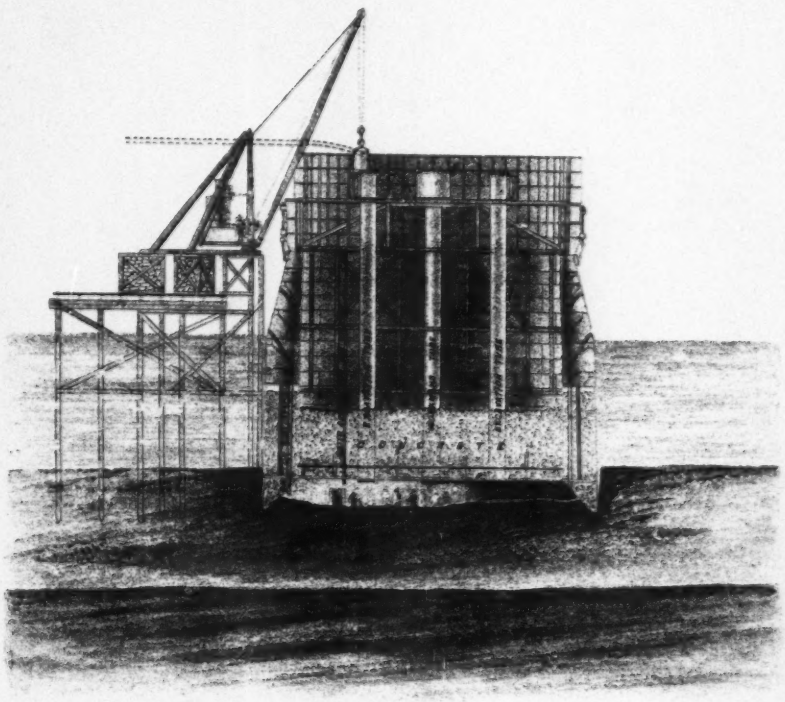


AISSON BEING FLOATED OUT.

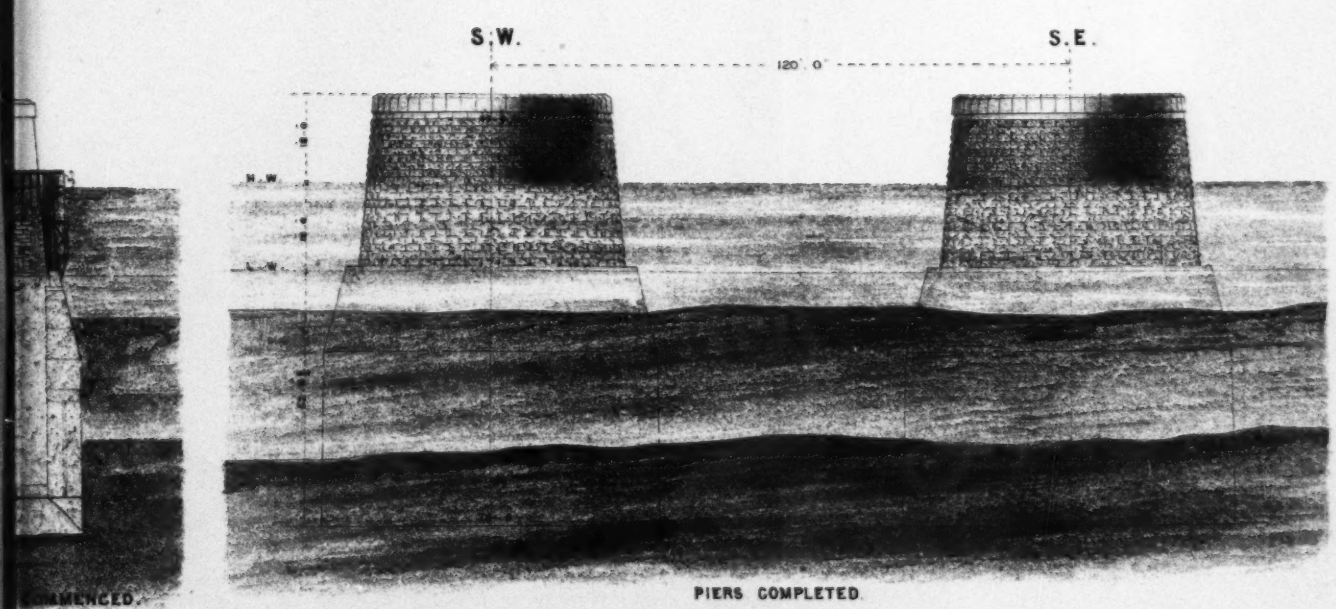


CAISSON MOORED ALONGSIDE STAGING TO HAVE CONICAL PART COMPLETED.





CAISSON IN POSITION, AND EXCAVATORS AT WORK.

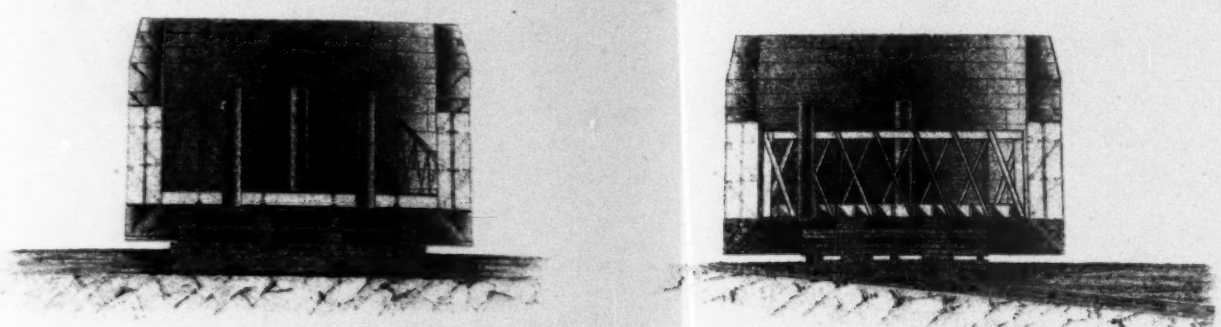


MENCED.

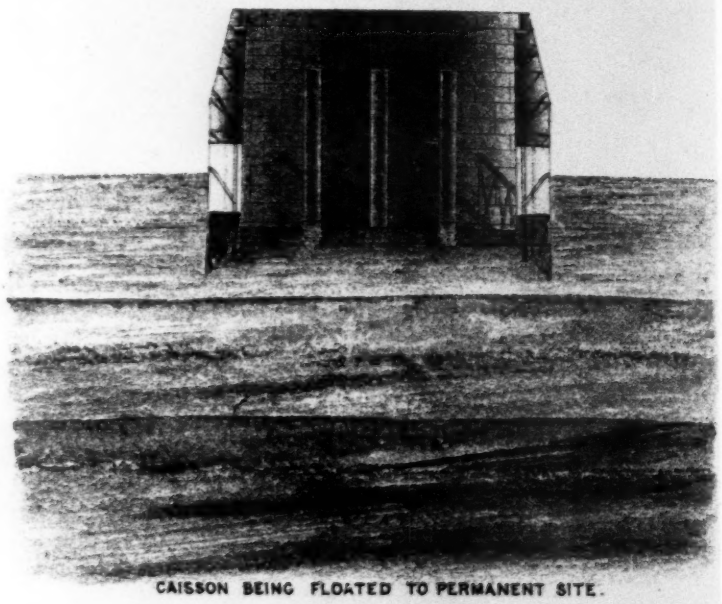
PIERS COMPLETED.

INK PHOTO. SPRAGUE & Cº LONDON.

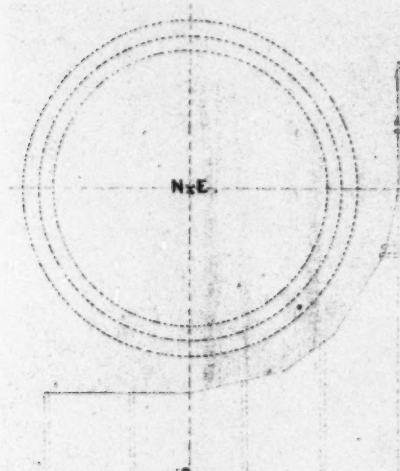
SONS.—MR. B. BAKER, ENGINEER.



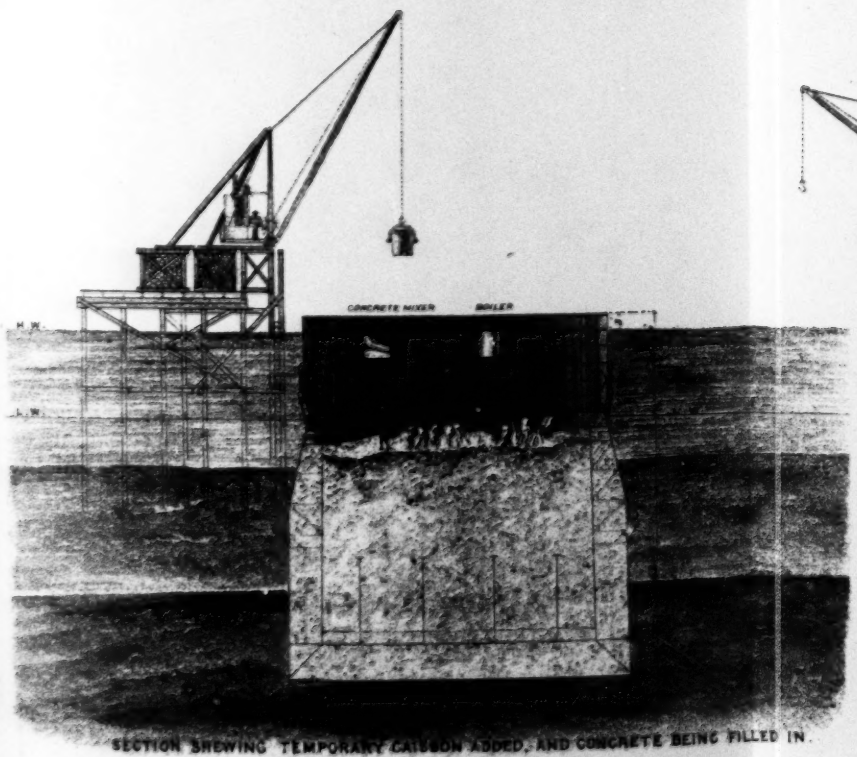
CAISSON ON LAUNCHING SLIPS.



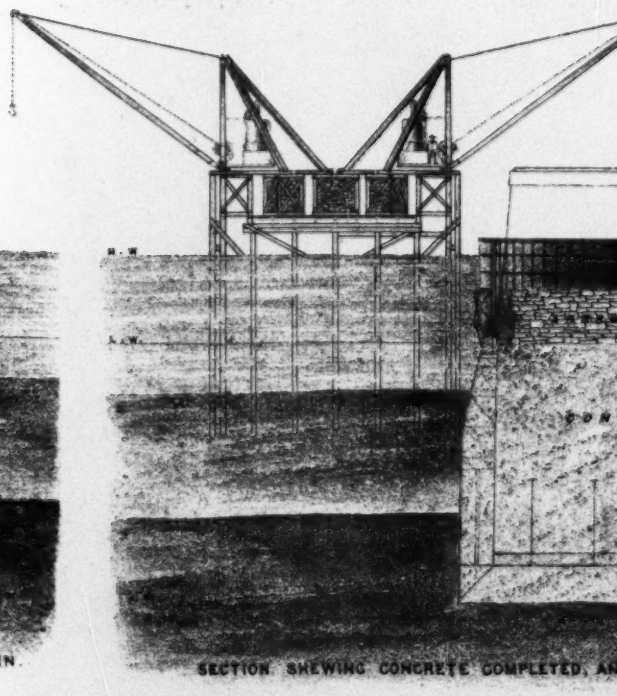
CAISSON BEING FLOATED TO PERMANENT SITE.



GENERAL
SHEWING HEAD
POSITION OF



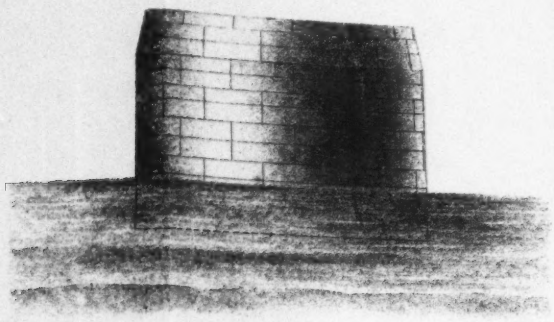
SECTION SHEWING TEMPORARY CAISSON ADDED, AND CONCRETE BEING FILLED IN.



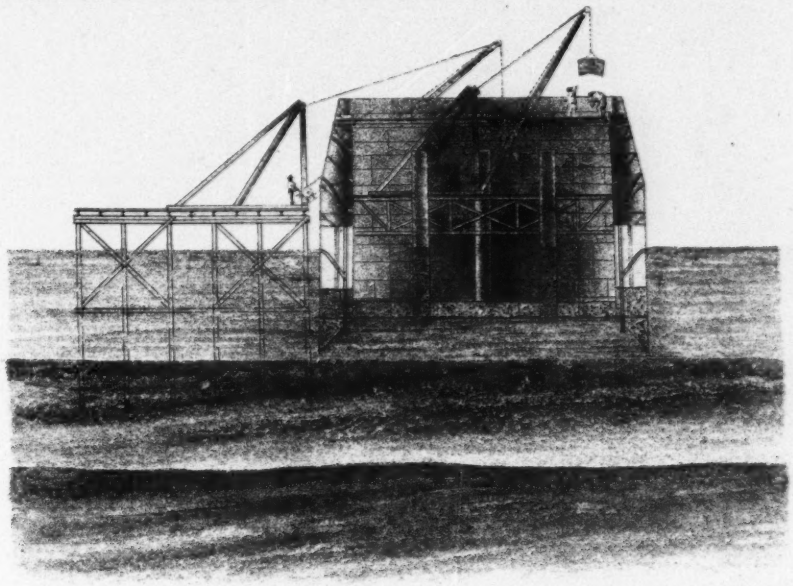
SECTION SHEWING CONCRETE COMPLETED, AN

FORTH

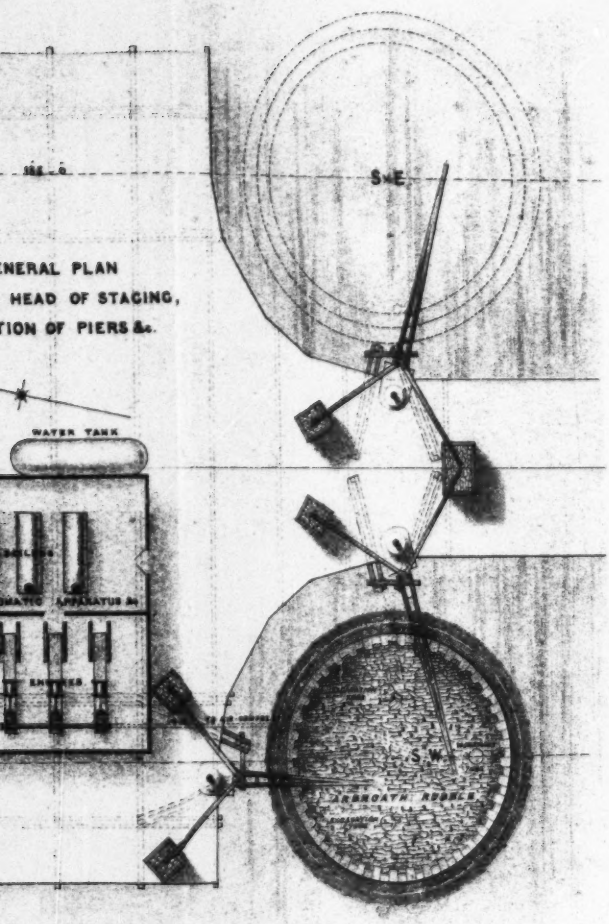
DRAWINGS SHEWING CONSTRUCTION AND PLAC



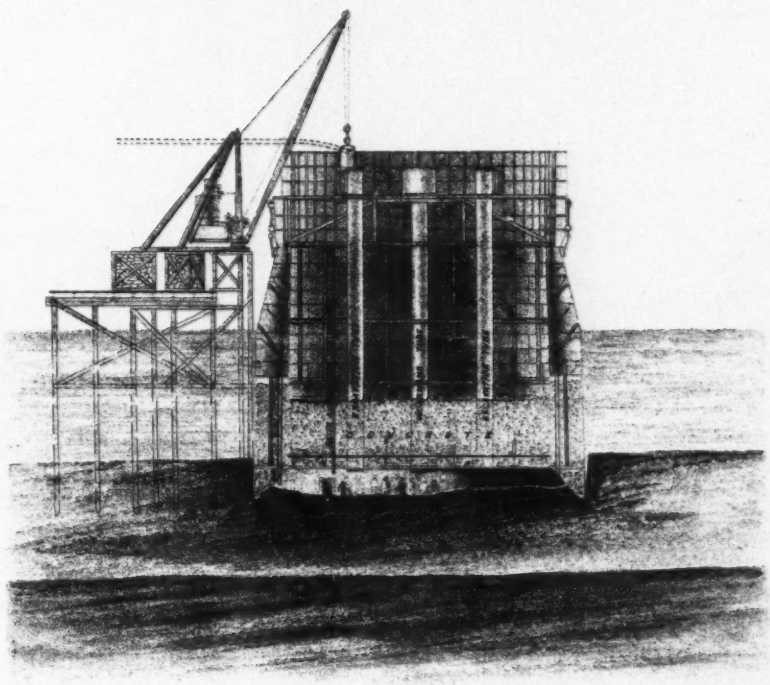
CAISSON BEING FLOATED OUT.



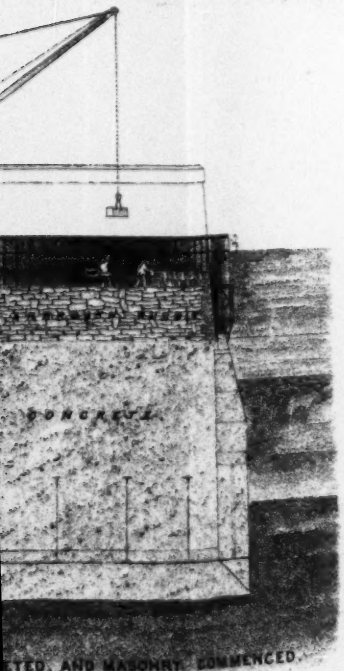
CAISSON MOORED ALONGSIDE STAGING TO HAVE CONICAL PART COMPLETED.



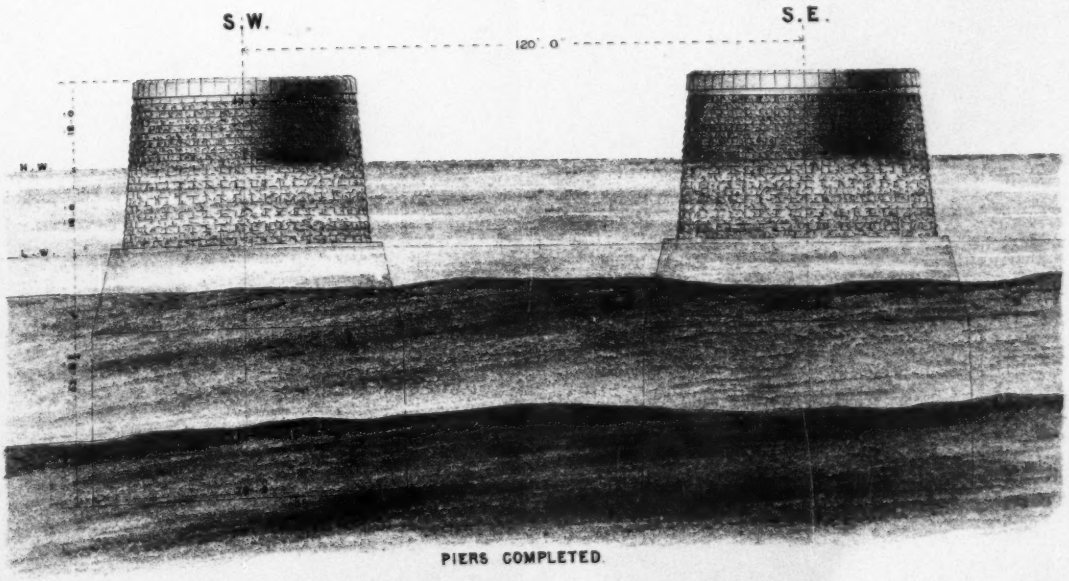
NERAL PLAN
HEAD OF STAGING,
TION OF PIERS &c.



CAISSON IN POSITION, AND EXCAVATORS AT WORK.



TED, AND MASONRY COMMENCED.



PIERS COMPLETED.

INK PHOTO. SPRAGUE & Cº LONDON.

ORTH BRIDGE.

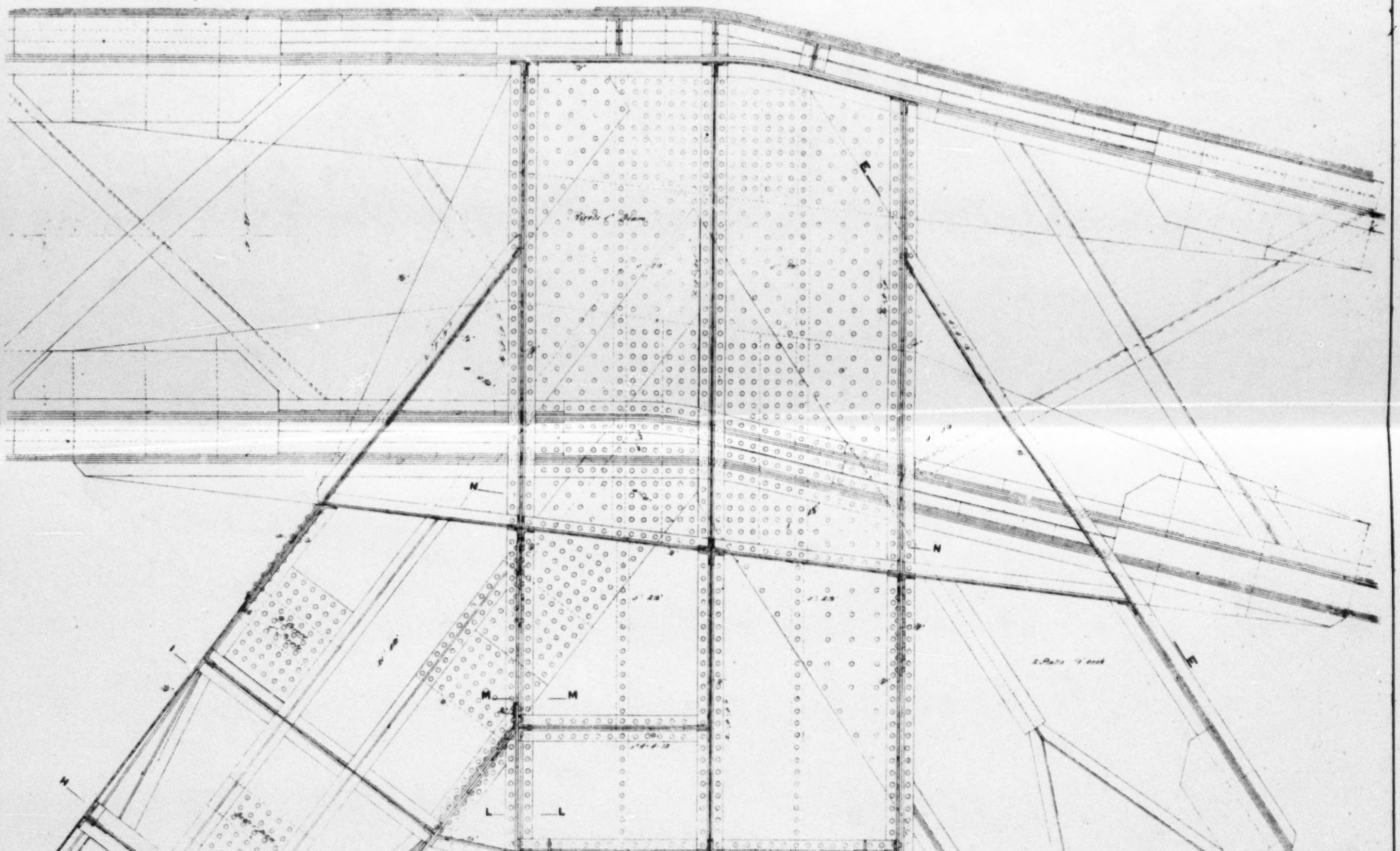
ND PLACING OF CAISSONS.—MR. B. BAKER, ENGINEER.

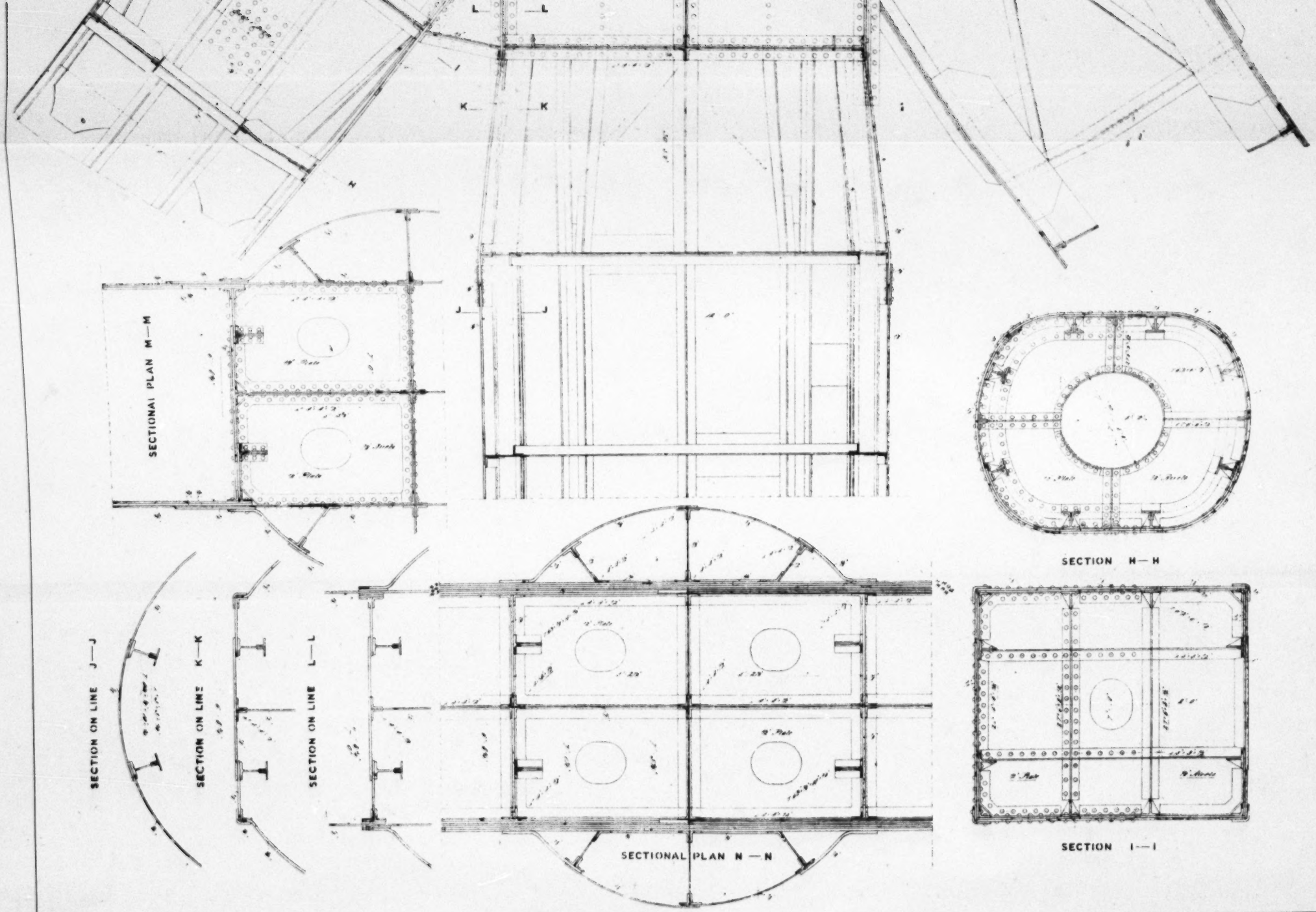
FORTH BRIDGE — JUNCTION OF MEMBERS AT TOP OF VERTICAL COLUMN — DRAWING No 144

INCH GARVIE PIER

SECTIONAL ELEVATION

SCALE $\frac{1}{4}$ INCH = 1 FOOT





Wyman & Sons Photo-Litho

C. Queen St London W.C.

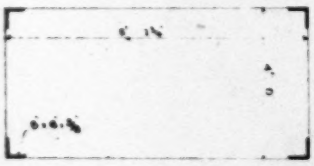
FORTH BRIDGE: DETAILS OF IRONWORK.——Mr. B. Baker, Engineer.

FORTH BRIDGE

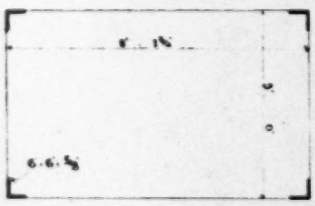
SECTION A A

SECTION B B

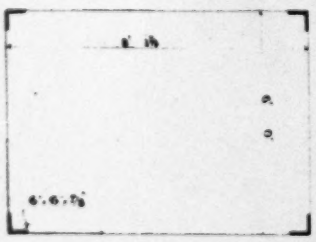
SECTION C C

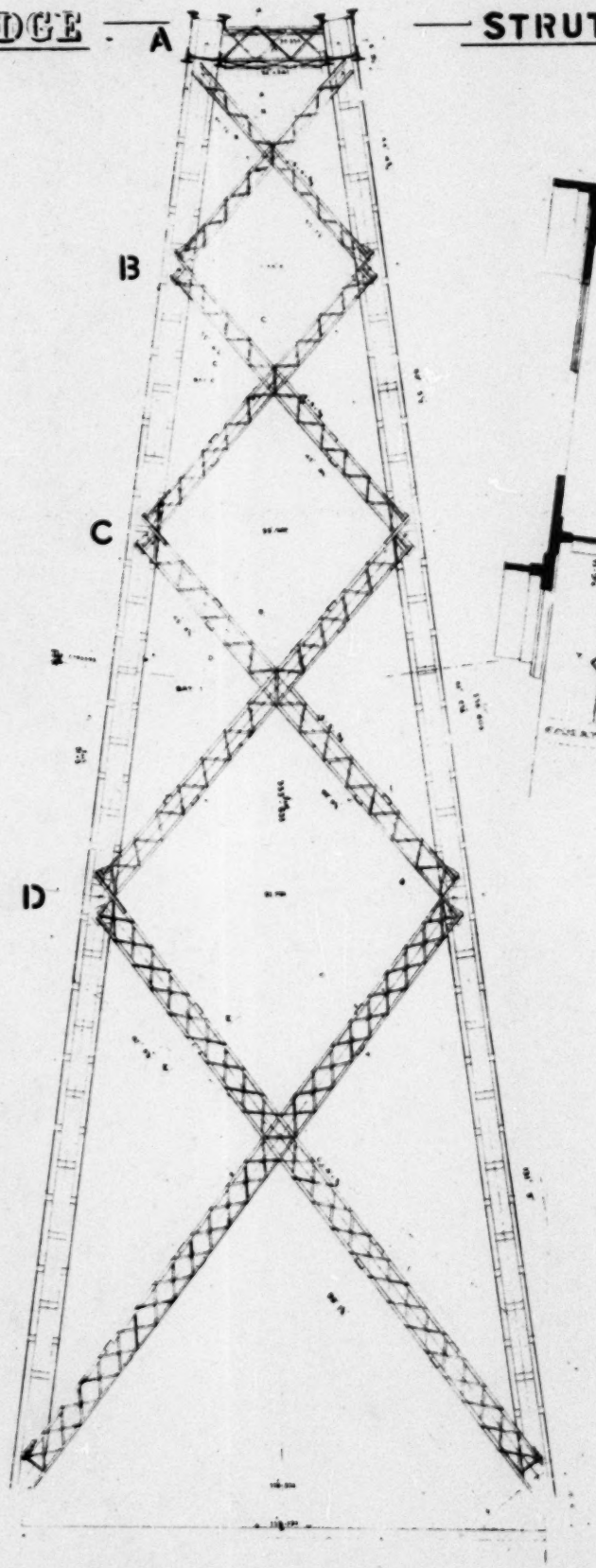


SECTION D D

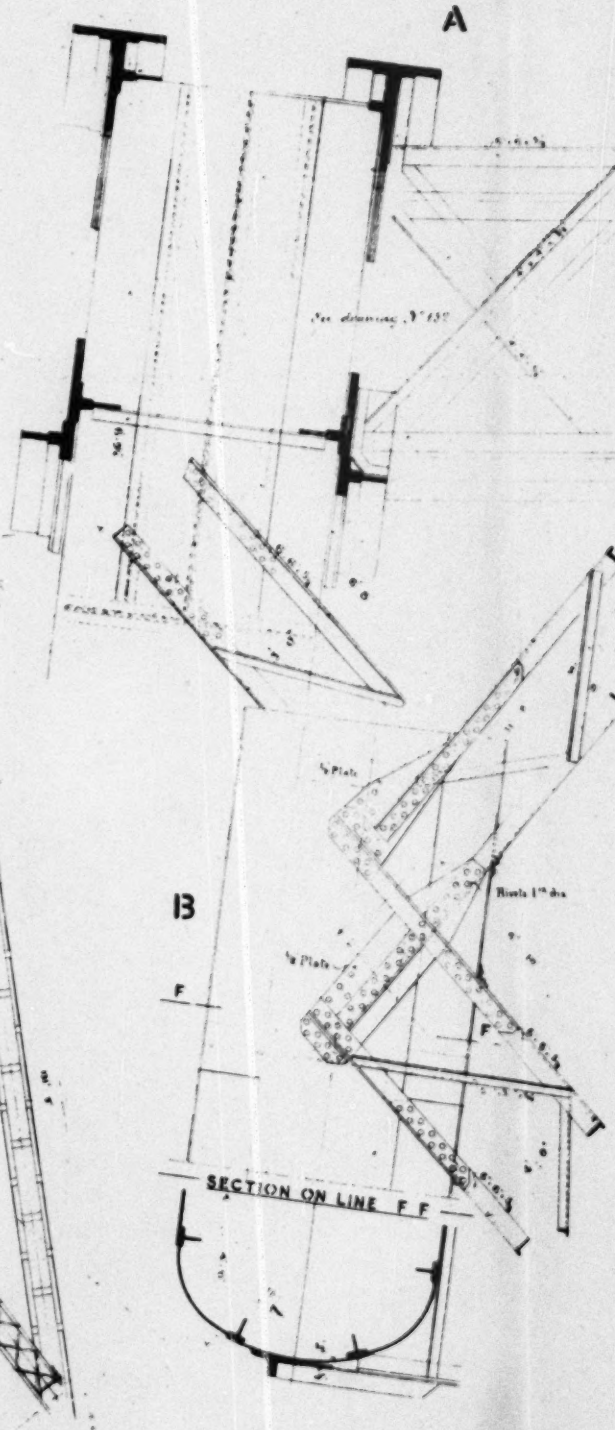


SECTION E E





STRUT Nº 1 [WINDBRACING]



Scale ¼ Inch to a Foot

Wyman & Sons Photo-Litho

FORTH BRIDGE: DETAILS OF IRONWOR

ING] —

See drawing N° 136

DRAWING N°135

C.

D

Scale ½ Inch to a Foot

SECTION ON LINE G G

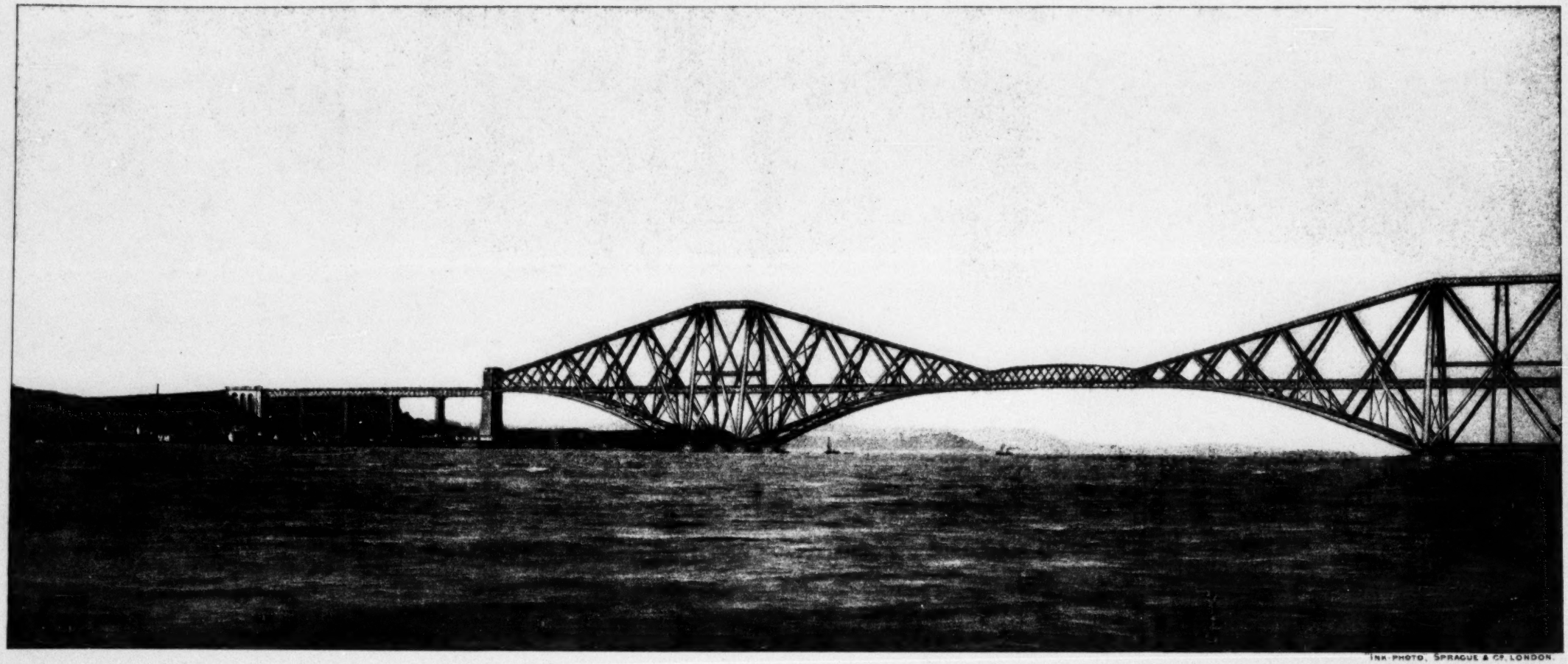
SECTION ON LINE J J

SECTION ON LINE K K

SECTION ON LINE H H

6 Queen St London WC

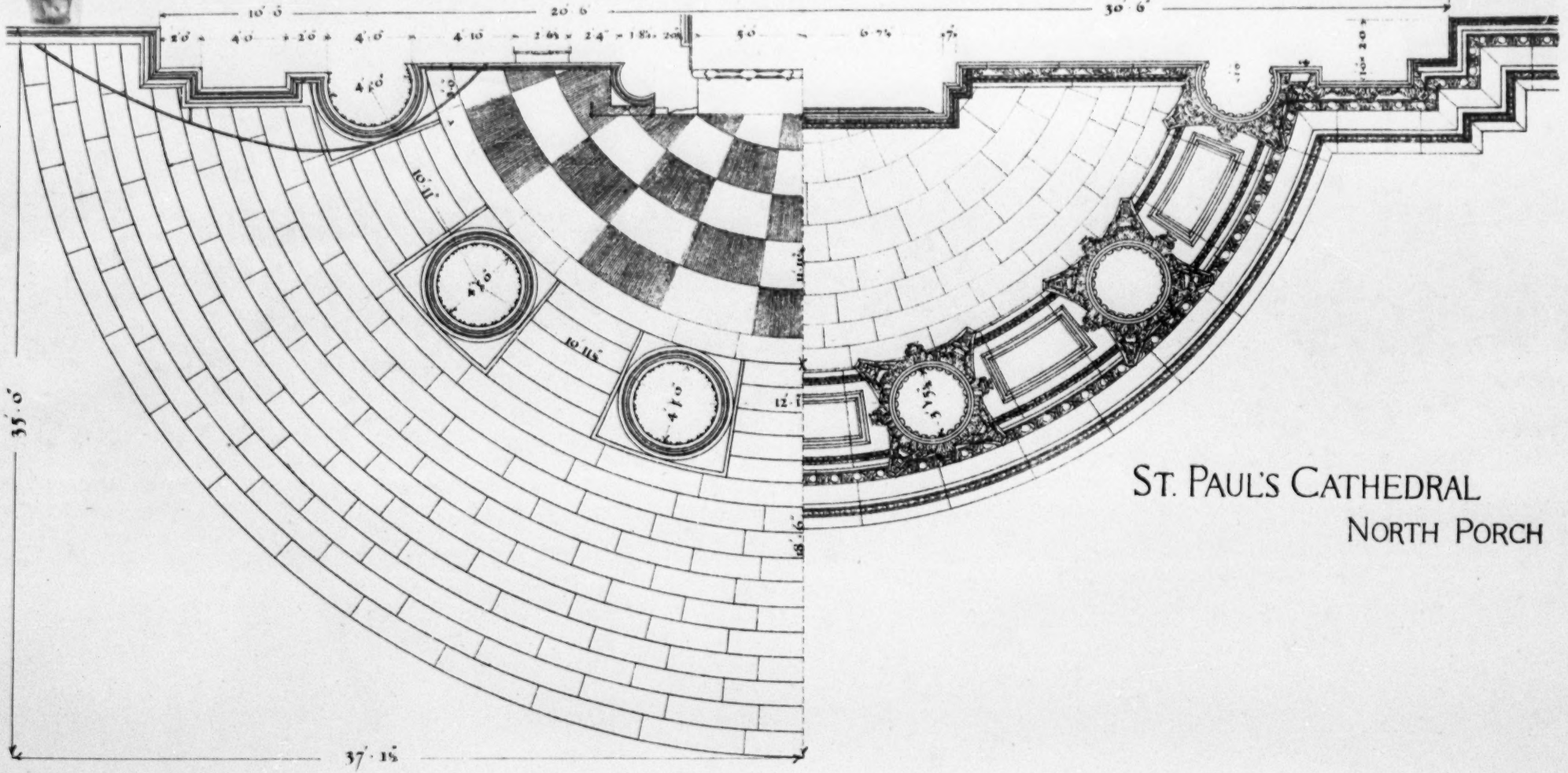
NWORK.—MR. B. BAKER, ENGINEER.



INK-PHOTO, SPRAGUE & CO. LONDON.

FORTH BRIDGE.

PERSPECTIVE VIEW, SHEWING SCALE IN RELATION TO THE LANDSCAPE.



ST. PAUL'S CATHEDRAL
NORTH PORCH

HALF PLAN OF GROUND

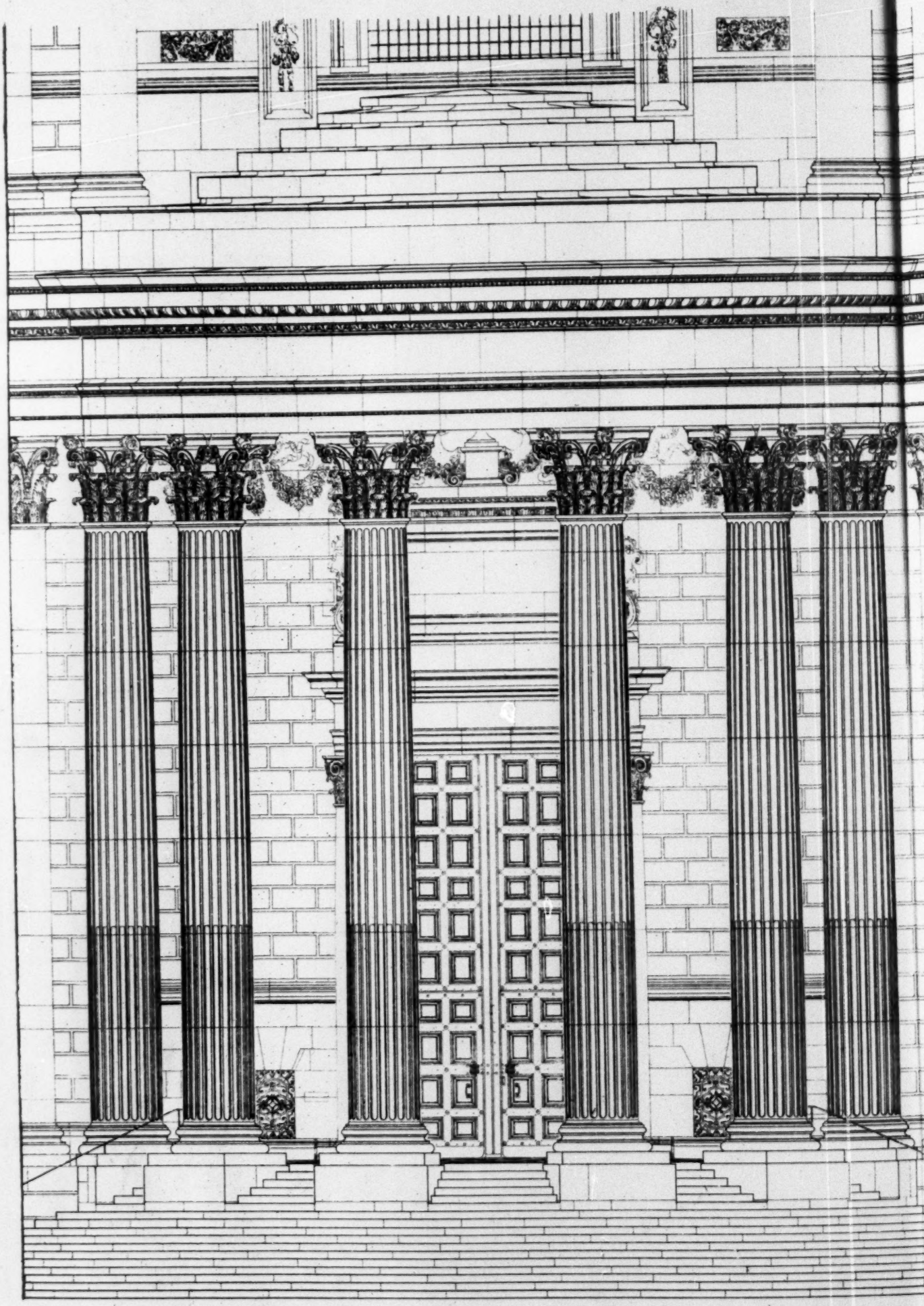
HALF PLAN OF CEILING

Scale of Feet

C. F. Kell Photo-Lith. & Printer, 6, Castle St. Holborn, London E.C.

ROYAL ACADEMY FIRST SILVER MEDAL AWARDED TO Mr F. W. TROUP, 1885.

ST. PAUL'S CATHEDRAL · NORTH PORCH



ELEVATION

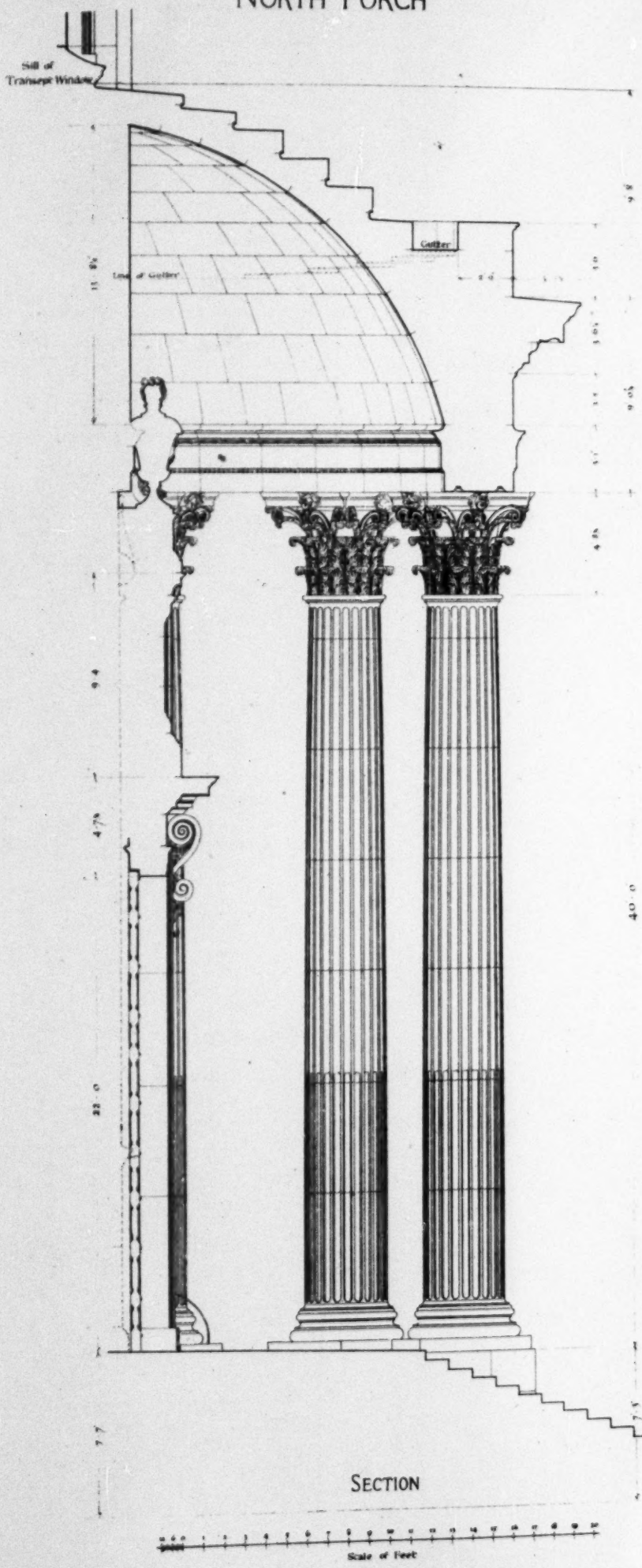
Scale of Feet

C. F. Kell Photo-Lith & Printer

ROYAL ACADEMY FIRST SILVER MEDAL AWARDED TO Mr F. W. TROUP, 1885.

ST. PAUL'S CATHEDRAL

NORTH PORCH



SECTION

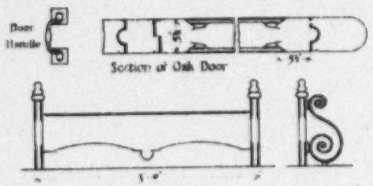
8 Castle St Holborn London E C

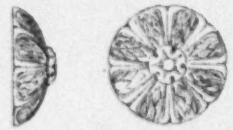
Quarter plan of Column at Neck and Base
Plan of Door Jamb
Console in side and section through Small Cap.
Side of Truss
Door
Key for Details
C F Kell Photo-Lith & Printer 8 Castle St Holborn London E C

ROYAL ACADEMY FIRST SILVER MEDAL AWARDED TO Mr F. W TROUP, 1885.

ST. PAUL'S CATHEDRAL
NORTH PORCH · DETAILS

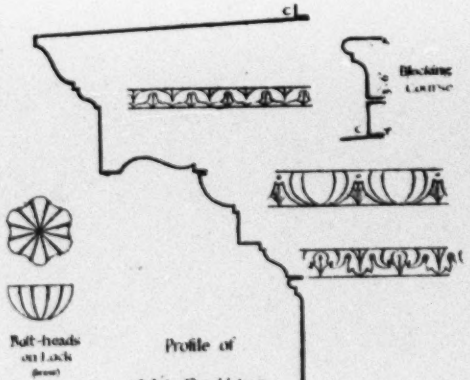
Wrought Iron Grille and Foot-Scraper at side of Door.



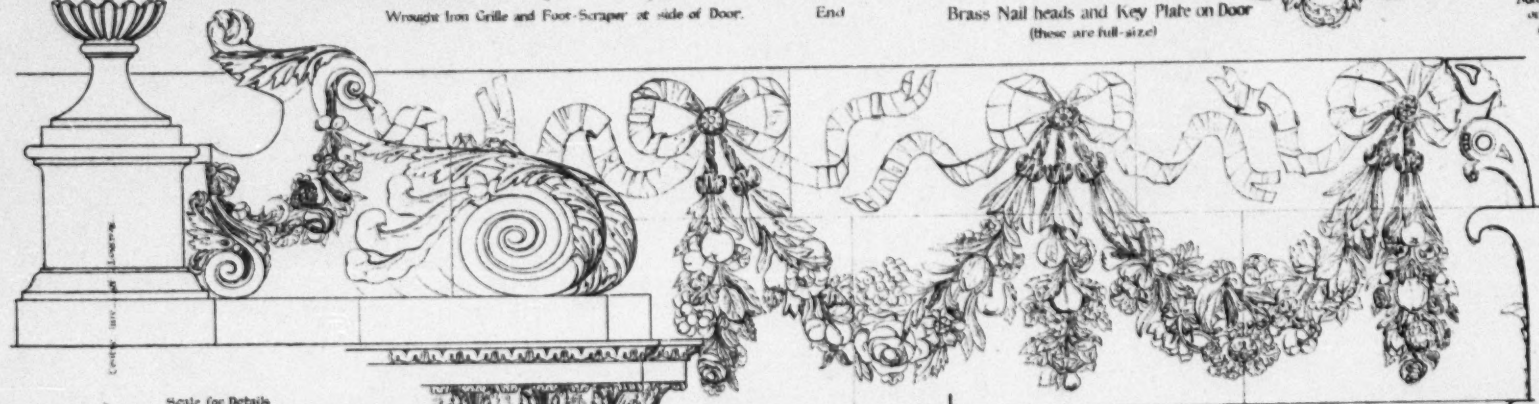


Brass Nail heads and Key Plate on Door
(these are full-size)

Nail-heads on Lock (brass)

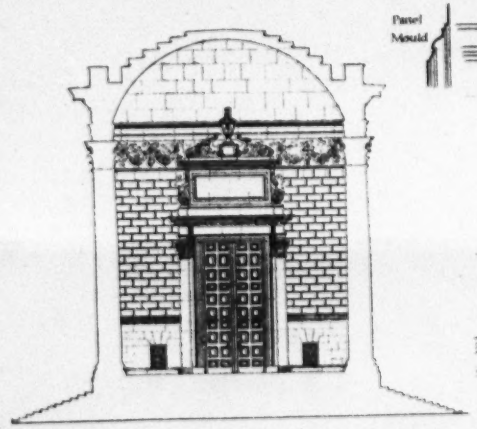


Profile of Main Entablature

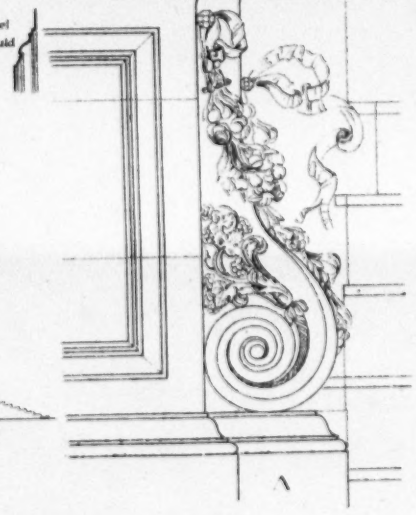


Section through Main Cap.

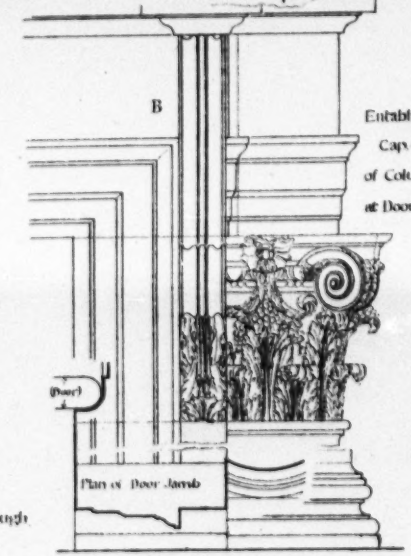
Scale for Details
Inches 6 4 2 0 1 2 3 Feet



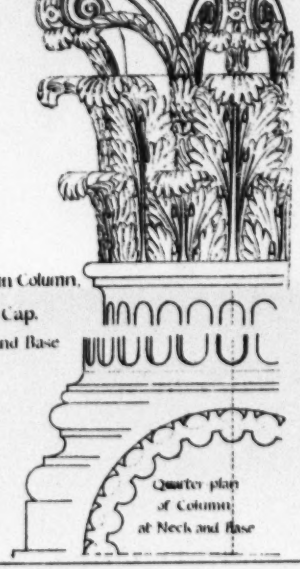
Elevation of Doorway
Key for Details
Scale of 10 5 0 10 20 30 Feet



String and Base at side of Door

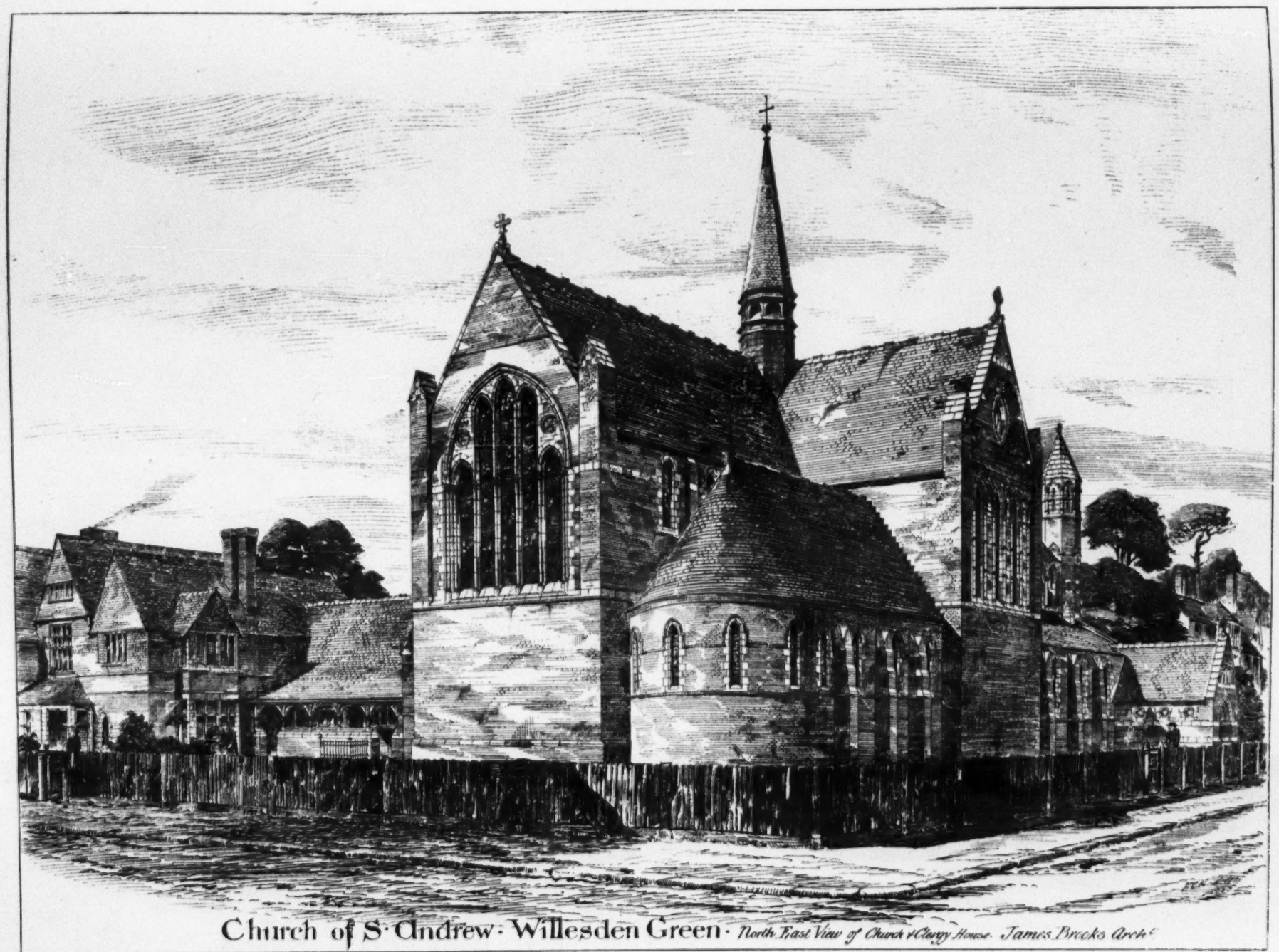


Entablature, Cap &c. of Column at Doorway



C F Kell Photo-Lith & Printer 8 Castle St Holborn London E C

ROYAL ACADEMY FIRST SILVER MEDAL AWARDED TO Mr F. W TROUP, 1885.



Church of S. Andrew · Willesden Green · *North East View of Church & Clergy House. James Brooks Arch.t*

PHOTO-LITHO. SPRAGUE & Co. LONDON

the centre of the bridge is 150 ft. above high-water, and the highest part of the bridge is 361 ft. above the same datum. Each of the three main piers consists of a group of four cylindrical masonry and concrete piers, 49 ft. in diameter at the top, and from 60 ft. to 70 ft. in diameter at the bottom. The deepest pier is about 70 ft. below low-water, and the rise of tide is 18 ft. at ordinary springs. In the piers there are about 120,000 cube yards of masonry, and in the superstructure about 45,000 tons of steel.

The caissons, which were built on shore, launched and floated into position, are 70 ft. in diameter at the cutting edge, and taper 1 in 46 to facilitate sinking. At 1 ft. above low water, which is the top of the permanent caisson and commencement of the granite-faced masonry, the diameter is 60 ft. A working chamber 7 ft. high is provided at the bottom of the caisson, the roof of which is supported by four strong lattice girders 18 ft. deep, and cross girders 3 ft. deep spaced 4 ft. apart. An internal skin 7 ft. distant from the external skin, and vertical diaphragms, form pockets which can be filled with concrete at any point where, owing to the slope of the ground and the varying hardness of the silt and clay, a heavier pressure is desired to force down the caisson. Three shafts, 3 ft. 6 in. in diameter, with air-locks at the top, pipes for admitting water and ejecting silt, and other of the usual appliances, are provided. The air-locks for passing out the clay and boulders as designed by Mr. Arrol and myself have, instead of the usual hinged doors, two sliding doors like horizontal sluice valves, across the 3 ft. 6 in. shafts, which are worked by little hydraulic rams, or by hand, and are interlocked like railway points and signals, so that one slide cannot be opened until the other is closed. Mounted on the side of the air-lock is a steam engine which, by means of a shaft passing through a stuffing-box in the side of the air-lock and a drum inside, winds up the excavated material in skips containing one cubic yard. The operation of hoisting, opening slides, and discharging is rapidly performed, so the two locks have a large working capacity. A third air-lock, with side doors, ladder, and hoist, is also provided for the men.

All of the pneumatic caissons are filled with concrete up to low-water mark, the mixture being 27 cubic feet of broken whinstone, 7 cubic feet of sand, and 5½ cubic feet of cement, which together make a full yard of concrete, having a crushing resistance of about 50 tons per square foot.

Above low water the cylindrical piers, which are 49 ft. in diameter at the top, 55 ft. at the bottom, and 36 ft. high, consist of the strongest masonry, the hearting being flat-bedded Arbroath stone with both horizontal and vertical bond, and the facing Aberdeen granite, the whole set in two to one cement mortar, and built in the dry within temporary wrought-iron caissons. In the shallow piers where the rock is stepped the masonry is carried down to the rock itself, and wrought-iron hoops 36 in. by 1½ in. bind the bases of the piers. At the top of all the piers 18 in. by 1½ in. hoops, and midway down 18 in. by ¾ in. hoops, are also built in, and it is believed that these cylindrical masses of masonry are as completely monolithic as can be attained or desired. In each cylindrical pier there are forty-eight steel bolts 2½ in. in diameter and 24 ft. long to hold down the bed-plates and super-structure of the main spans.

Over the piers the arched tubular lower member forms a connexion with the upper bed-plates, the vertical and diagonal tubes, and the lateral and vertical cross bracing, so that considerable thought had to be given to the details at this point. A full-sized model was prepared, and different modes of arranging the junctions were set out and modelled. Finally, it was decided to gradually change the tubular lower member into a box form with one rounded upper corner, where it meets the skewback or part over the pier, and by internal vertical and horizontal diaphragms, to make the latter a cellular structure of enormous strength and stiffness, offering facilities for attachments in any required direction. Several layers of plates form the bottom of this skewback, and constitute what may be termed the "upper bed-plate" of the bridge. The "lower bed-plate" consists of similar layers of plates riveted together and bolted to the pier; and the two bed-plates are free to slide on each other within certain limits to be referred to more particularly hereafter. The layers of plates run longitudinally and transversely, to meet the different stresses; and, after the edges are planed, the plates are fitted together, clamped between girders, and drilled by special machines through their whole thickness. About 1,000 lineal feet of 1¼ in. holes have to be drilled in each bed-plate, which in practice with the eight-drill machine takes about eighteen days, including stoppages. In the upper bed-plates holes about 11 in. square, with corners rounded to a 3-in. radius, are required, in some instances, to clear the nuts of the holding-down bolts, and these are cut readily by a simple tool devised by Mr. Arrol. In other cases, 12-ft. diameter recesses, 2 in. deep, have to be bored for what may be termed a huge key or dowel, which will connect the upper and lower bed-plates, but allow a slight rotation; and this also requires a special tool.

The tension members and cross bracing generally consist of box lattice girders, which are drilled by travelling machines of similar type to those already referred to in connexion with the tubular members. All of the rivets are of steel, having a tensile strength of about 27 tons, an elongation of about 30 per cent., and a shearing resistance of from 22 tons to 24 tons per square inch. It is hardly necessary to state that hydraulic riveting is used throughout. The nuts and washers of the holding-down bolts and some other parts are of cast steel, having a tensile strength of 30 tons per square inch, and an elongation of 8 to 10 per cent.

Owing to the enormous size of the structure elastic deformations which may be neglected in ordinary cases have to be provided for.

Obviously during the early stages of erection, before much weight comes on the bed-plates, the tube will be practically free to expand and contract. Ultimately, when the whole weight of the completed structure rests on the piers, the friction between the two surfaces of the upper and lower bed-plates will probably be sufficient to prevent movement except under extremes of temperature and heavy wind pressure of rare occurrence. The attachment of the superstructure to the piers partakes thus of the character of a safety friction clutch. Movement will not occur under ordinary circumstances, and, if an excessive shock from some unforeseen cause arise on the superstructure, it can only be transmitted to the masonry of the pier through the sliding surface of the upper and lower bed-plates."

Mr. Baker has kindly supplied us with the following notes as to the state of the works at the present moment:—

PIERS.

South Queensferry Main Piers.—Three of the four piers in this group are completed, and the last has been sunk to a depth of 50 ft. below low water.

Inchgarvie and Fife Main Piers.—Seven are finished, and the eighth is carried up above high water.

The Viaduct Piers are all carried up to the height at which the girders are first erected. On the five north spans the girders are built, and are being raised by hydraulic machinery. The operation of building the piers is carried on simultaneously. On the south side seven of the girders are built, but the raising has not been commenced.

SUPERSTRUCTURE.

About 16,000 tons of steel plates, angle-bars, and other forms of material for the 1,700 ft. spans, have been delivered at the shops at Queensferry. There the operations of fitting them together, planing, and drilling are being carried on; and about 10,000 tons are completed ready for erection. The work of erection has commenced at each of the three main piers. At South Queensferry, two of the "lower bed-plates" have been placed in position. At Inchgarvie also two bed-plates have been placed, and the massive horizontal tube between the piers is erected. At Fife, all the lower bed-plates are laid, the horizontal tubes between the piers, and the complicated mass called the "skewback," resting directly over the piers, is well in hand.

The most interesting events that have happened lately have been the rapid and successful founding and erection of the deep piers for the Inchgarvie group, and the recovery of the South Queensferry caisson, which was wrecked on the 1st of January, 1885.

CHURCH OF ST. ANDREW, WILLESDEN GREEN.

THIS is a good example of the qualities of picturesqueness combined with solidity and simplicity, for which the churches designed by its architect, Mr. Jas. Brooks, are notable. There is scarcely anything of what is usually called "ornament" in the church and the clergy-house with which it groups in so pleasing a manner; yet the effect of the whole is to produce an architectural picture of no ordinary charm.

NORTH PORCH, ST. PAUL'S CATHEDRAL.

THE three sheets of lithographs, giving the elevation, section, plan, and decorative details of the North Porch of the Metropolitan Cathedral, are reproduced from the set of drawings which gained their author, Mr. F. W. Troup, the Royal Academy Silver Medal for measured drawings of architecture. At a time when the architecture of Wren is so much studied as now, careful drawings of this portion of his great building, of which we believe there is no published illustration on the same scale and of the same accuracy, will probably be valued by many of our readers. We do not, however, profess admiration for all the decorative details, in spite of Wren's name. Festoons and ribbons are not decorative design, in the true sense of the word.

OBITUARY.

Dr. Samuel Birch, F.S.A.—We record with much regret the death of Mr. Samuel Birch, D.C.L., LL.D., F.S.A., Keeper of the Egyptian and Oriental Antiquities in the British Museum, which took place after a short illness at noon last Sunday, at his residence, Caversham-road, N.W. According to the *Times*, Dr. Birch, who had just completed his seventy-second year, was the grandson of Samuel Birch, Alderman and Lord Mayor of London, and eldest son of the late Rev. Samuel Birch, D.D., rector of St. Mary Woolnoth, in the City of London, and vicar of Little Marlow, Buckinghamshire. In 1834, Dr. Birch entered the service of the Crown under the Commissioners of Public Records, where he was the contemporary of the late Sir Thomas Duffus Hardy. In January, 1836, he received an appointment under the Trustees of the British Museum, in whose service he has spent just fifty years. On the retirement of Mr. Barnewell, he became Assistant Keeper of the Department of Antiquities,—a miscellaneous mass at that time, including the whole range of Greek, Roman, British, Oriental, and Egyptian archæology, as well as ancient and Mediæval numismatics and ethnology. In 1861, on the subdivision of this vast and valuable collection, Dr. Birch undertook the responsible position of Keeper of the Oriental, British, and Mediæva Sections. At a subsequent period of further division, his attention was confined solely to the Egyptian and Assyrian antiquities, with which his name will always be associated. We may add that he was one of the founders, and the President, of the Society of Biblical Archæology. He was the author of a long list of works, and had been for many years an occasional contributor to the columns of the *Builder*.

Mr. Thomas Goodchild, F.R.I.B.A. — We record with regret the death of Mr. Thomas Goodchild, which took place a few days since, after a protracted illness. For some years he held the office of Surveyor to the Teddington Local Board. He was elected a Fellow of the Institute of Architects in 1880. His works include the Free Church of England, the Wesleyan Chapel, and the Vicarage (the latter illustrated in the *Builder* for July 3, 1880) at Teddington; and the Vicarage at Hampton. His design in the Bagshot Church competition was placed second, and was illustrated in the *Builder* for March 25, 1882.

Tarnished Silver for Decorative Use.—In reference to our "Note" on this subject (p. 815, *ante*), we may mention that a specimen panel of the decorative use of this material may be seen at the shop of Mr. Merrick, carver and gilder, 200, Brompton-road.

DISCOVERY OF SCULPTURED FIGURES AT CLAPHAM.

A VERY remarkable discovery has been made beneath the modern Church of St. Paul, Clapham. This building, a long, flat-roofed mass of brickwork, pierced with two ranges of windows, is conspicuous enough from the elevated position it occupies close to the Wandsworth-road.

It stands on the site of the old parish church of Clapham previously to the erection of what is now the actual parish church on Clapham Common. Mr. J. W. Grover, C.E., F.S.A., having recently delivered a lecture upon the various associations and buildings of old Clapham, was led to test the accuracy of a passing remark in Brayley's "History of Surrey," that certain remarkable monumental figures formerly in the old church had been deposited in one of the vaults. There was also a local tradition that some of the monuments had been stowed away when the church was demolished. Acting upon these data, and with the friendly help and assistance of the Local Burial Board, Mr. G. Aldridge, one of the members of the Board, and Mr. Grover set to work. An old wall was soon reached by their workmen, and, this being followed, a flight of steps was found, leading to a vault, apparently extending beneath the present church. All knowledge of this entrance had been lost, the burial-ground being closed. There was nothing to bar the entrance to the vault, and the workmen speedily called the explorers to enter. The vault appeared to be a subterranean museum of sculpture as the lights revealed the contents. In one place, facing them, was a magnificent marble figure of a knight in armour, opposite was the figure of a younger man. In the vault beyond was that of a lady of mature years. Beyond was a sitting figure of a young lady in full evening costume with an elaborate arrangement of ringlets. In a small corner was the standing figure of a young child holding a skull. All these were found to be of pure white marble, still clean and but little covered with dust, so that, in some places, the polished surfaces remained. This discovery on becoming known has created a great deal of remark beyond the locality itself, and it may be of interest to render a few notes of the local history, which we now proceed to do. The monuments are described by several old writers who had seen them when they were in their original positions, and the frequency of these remarks attests the interest which they appear always to have obtained.

The parish church of Clapham appears to have passed through the long phases of history which are very much the same in the case of each of these venerable buildings scattered throughout our land in such great numbers. The manor is named at a very early period, since in King Alfred's time it was charged with an annual payment to the monks of Chertsey of 200 pence. Its owners are mentioned in the time of Hardicanute, since the drunken feast which caused the monarch's death was for the purpose of celebrating the marriage of the daughter of its then lord with a Danish nobleman. Domesday Book has its record of the district, but no mention is made of the church,—a circumstance not at all conclusive, as showing that it did not then exist. We know that it was standing in the twelfth century, since the advowson then passed to the monks of Merton Abbey, who appear to have held it until the Dissolution. A chantry was founded here by Thomas Romayne in the fifteenth year of Edward II. Then there are records of more recent additions as follows:—The form of the building, which was probably only a nave and chancel originally, was altered in 1500, when a chapel was added on the north side, close to the west end. A corresponding chapel was added on the south side, called Walter Frost's Chapel. These are stated to have been in the form of western transepts, and that on the north side, at any rate, had a north gable, with a ridge going north and south. It is probable, however, that this projection was not the Atkins Chapel, which was more probably at the east end of the north aisle. A north aisle was added about 1715, by Mr. Hewer E. Hewer, and a south aisle was erected at the same time at the expense of the parishioners. The building continued in this condition until 1774, when the growing population required still further accommodation, and by an Act of Parliament the new church on Clapham Common was then erected, and constituted the parish church. The old building was then demolished, except the north aisle, which was retained for burial services, until the erection of the present St. Paul's Chapel on part of the site in 1814, when it was pulled down entirely. The old church was remarkable for a large number of monuments, which are spoken of as being of excellent workmanship. These are described by the old writers already referred to, and the inscriptions are given at length. These will be noted in part as we proceed. The principal monuments were those of Sir Richard Atkins, knt. and bart., and his lady, Rebecca, the wife of Sir Edward Wright, who were represented by recumbent figures of white marble on an altar tomb. They were buried in a vault in the churchyard. Close to them were figures of Henry, the eldest son, and Rebecca and Annabella, their first and second daughters, the monuments having been erected by their parents, there being verses beneath each of them.

As a specimen, that on Annabella, the eldest daughter, who died in 1670, in her nineteenth year, is subjoined. The verses were somewhat similar beneath each of the other two figures, but those now given may be taken as fair samples of the rest:—

> "Could Teares have sav'd her precious Life, noe doubt,
> A gen'ral Deluge had been pour'd out;
> Or could the skill of all the learned have
> Prevailed, but to reprieve her from the grave,
> Mankind had ne'er permitted soe much Worth
> (To theyre great Loss) to vanish from the Earth.
> She dyed young:—not that she really could
> Be Weary yet so soon of doeing good;
> But fit for Heaven she without pretence
> Might justly scorn a meaner Residence."

Messrs. Brayley & Britton, in their "History of Surrey," state, in a footnote, that the above monument was entirely destroyed, and the effigies themselves consigned to sepulture in one of the vaults when the new chapel was built. "Although in a bad taste in regard to dress,—the son, who died at the age of twenty-four, in February, 1677, being represented in a Roman dress, with a flowing peruke, and the daughters in gowns with full sleeves and stiff bodices,—they were superiorly wrought and deserved preservation above ground."

We are indebted to Lysons's "Environs of London," 1792, for information as to the then position of the monuments in the old church. The building had been at that time pulled down except the north aisle (he says the south aisle by mistake). The tomb of Sir Richard and his wife was at the north-east corner, and it still possessed its curious iron railings and pennons, the armorial bearings being given by Lysons. Adjoining it, on the east wall, was the monument of their three children,—Henry, who died in 1677, aged twenty-four; Rebecca, who died in 1661, aged nine; and Annabella, already referred to. These stone monuments appear to have been grouped into one composition, for Lysons states that their effigies are as large as life, under an arch supported by columns of white marble of the Corinthian order. "The son is represented sitting, in a Roman dress, with a flowing peruke. The daughters are standing, dressed in gowns with full sleeves puckered, and plain stomachers."

Reference is also made to many other monuments by the old writers, a few of which may be noted. The tomb of Bartholomew Clerke was on the south wall, and represented himself, his wife, and son kneeling, the whole being in a recess, above being the arms of Clerke and Haselrigge. Dr. Martin Lister's monument was also on the south wall, probably recently re-erected to shut in that side of the north aisle kept up. There were two old brasses on the south wall, that to the memory of W. Tableer having come from the old middle aisle. The monument of W. Hewer was on the north wall. Lysons gives the names of several other monuments which were destroyed when the building was pulled down; but he refers to the existence of one to the memory of Sir Lawrence Bromfelde, knight, who died in 1668, and which was then in the churchyard. This appears from Strype to have been a flat stone by the Communion rails.

There is an old view of the remains of Clapham Church, taken from the north-east, engraved in vol. 85, part 2, page 489, of the *Gentleman's Magazine*, drawn just before the demolition of this remaining portion to make way for the erection of St. Paul's Chapel. It shows an eastern portion standing like a small chancel attached to a western nave, the latter being, in fact, the north aisle. There is a transept-like projection at the west end with a gabled roof, the whole of this part being built of brick, having moulded cornices broken around pilaster buttresses, and round-headed windows are in the bays between them.

The eastern building is smaller and evidently of more ancient date, having a three-light window on the north side, with transom and Tudor arches in the heads, the whole being contained beneath a flat moulded label, returned at the angles.

A similar window is shown at the east end, but blocked. This was most probably the Atkins Chapel, for the monuments have been found as nearly as possible beneath it, as far as can be told by an examination of the site and the local surroundings. The view has been taken after the demolition of the nave and south aisle, and it therefore shows only the portion which remained from 1778 until 1814, and the demolition of this part itself took place before the view was published, the editor expressing the hope that the brasses and as many of the monuments as possible may be set up in the new chapel.

We have referred already to the inscriptions on the tombs, and have given a sample of the kind of versification employed. Should the others be required by any of our readers, they can be readily obtained, since they are given in full in the 1720 edition of Stowe's "London," edited by Strype. The Latin inscriptions on Sir Richard's tomb are also printed. These are given again for the most part in the description of the church in the *Gentleman's Magazine*. Strype also gives the armorial bearings on the tomb, and from his further notice we are able to ascertain that the monument of the Dean of Arches was originally on the south wall of the north aisle, and the position described by Lysons, after the demolition of the body of the church, was, doubtless, its original one,—at least, since the erection of the north aisle itself.

Bartholomew Clerke, Dean of Arches, was lord of the manor prior to its purchase by the Atkins family. He died in March, 1589, aged fifty-two. His wife, Eleanor Hazelrigge, was represented with him, together with their son. A daughter had been apparently at one time also on the monument, but her figure had disappeared in Strype's time. Both parents were represented kneeling before desks, the Dean being in a red robe.

Dr. Martin Lister, F.R.S., was commemorated with his wife, Hannah. He died February 2nd, 1711–12, having been for several years an inhabitant of Clapham, and bequeathed 5*l.* for a commemoration service for his wife. He was the author of the "Synopses Conchyliorum," published in two folio volumes in 1685, and containing a very good series of accurate engravings of all the shells known in his time, the drawings having been made by his two daughters.

The Wm. Hewer whose monument has been referred to was the servant and friend of Samuel Pepys, at whose fine house on the Common Pepys died.

A few days since we paid a visit to the monuments, thanks to a private view, cards for which had been issued by Messrs. Aldridge and J. Collins, members of the Burial Board. We found a stream of people constantly ascending and descending into the vault, the entrance to which is on the north side of the present chapel. The greatest possible interest was being shown in the discovery, and during the two or three hours when the entrance was open over 200 persons were computed to have inspected what had been found It was, indeed, a remarkable sight to find, on descending, a number of exquisitely-wrought figures standing out in strong and vivid relief from the darkness of the vault. Not to repeat what has been already stated, the following notes may serve to describe what exists:—The figure of the standing knight is that of Sir Richard Atkins, who died August 19th, 1689. He is clad in the light plate-armour of the period, a sash being gracefully arranged over it from his shoulders and looped around the armour; linen wristbands showing, and the head covered by a large wig of ringlets flowing down upon the shoulders. This is a recumbent figure, as is attested by the mattress, but it is now set upright. The companion figure, Sir Richard's wife, is to be found in the adjacent vault, lying upon two ancient leaden coffins. She is clad in a neatly-arranged gown, with a stiff-pointed stomacher; a tippet is elegantly arranged over the shoulders,

and the hair is covered with looped drapery. The eldest son, Henry, is in a sitting attitude, clad in Roman scale armour, closely fitting and flexible to the form, the arms and legs bare; he, too, has a large flowing wig. At the end of the vault the sitting figure is that of Annabella, whose epitaph has already been given. The head-dress is something very remarkable. It is carved with exquisite grace, adorned with pearls, while a string of pearls is around the lady's neck. The stomacher is very pointed and very low, the arms are bare from below the elbow joint, the upper part of the arm being covered with drapery. The costume is, in fact, evening dress, very beautiful, but rather remarkable for a funereal monument. A book is held in the left hand. The last figure to be noted is that of a little girl, the Rebecca of the inscriptions. It is a charming little figure, of pleasing expression, clad in a pretty child's dress, with an edging of lace elaborately carved. As the light fell upon the young little face, many of the visitors expressed their opinion that it was the best of the series. The expression of the face in no way prepares us for the skull which is held in the child's two hands. These figures are all life size, and carved in white marble of close grain. They are fine works of art, studied and grouped in an admirable manner; the countenances express such individuality that we have no doubt but that they are portraits to the life. The question naturally arises, Who was the sculptor? There is not a clue to this in any of the old writers consulted. This is, however, the fate of the sculptors of most of the monuments in the old churches around London, the works of art in these, of seventeenth-century date, being in fact, more numerous than ordinary observers may be ready to believe. Certain it is, that those at Clapham may be classed with the best. We observed, with no little interest, that some of the architectural members belonging to one or another of these tombs are piled up in various parts of the vault. There are two moulded ribs, apparently quadrants of a circle, which probably formed the semicircular arch of the three childrens' tomb, while in another place a white marble slab actually contains the three inscriptions, one of which, taken from Strype, and not from the work itself, we have already given. There are lengths of white marble cornice with flat modillions, lengths of black marble, one or two shields, two or three lengths of scroll work in black or grey, the light did not show which, with white shields, and mary corbels and such like, quite sufficient for a skilful hand to put the designs together again.

It is greatly to be hoped that these remarkable works will not be left to the darkness which has hung over them for more than eighty years. The interest taken seems to show very amply that this will not be the case.

The churchyard bears abundant evidence as to the great extent of the monuments so needlessly thrust out of the old church. One of the figures of the Dean of Arches' monument is, we are told, locked up in the heating apparatus; a large marble slab, apparently to the memory of Sir Richard Atkins's father, was recently found underground during some repairs. The tablet to Dr. Lister, and that of his wife, are on the external north wall. But a glance on leaving showed a rather remarkable monument of white marble, built into the north-west wall of the transept, of the large addition only recently made to the church. It is exposed to wind and weather. It is hardly to be credited when we state that this is the monument of William Hewer, the faithful friend of Samuel Pepys. We have already noted its position within old Clapham Church. It was thrust out at the demolition, built on to an external wall when St. Paul's was erected, taken down only recently, but again fixed externally.

A monument has been at last fixed in St. Olave's, Hart-street, to commemorate old Samuel Pepys; cannot something be done to save this of his friend from its most unworthy position?

Cheltenham Grammar School Competition.—The Governors have awarded the first premium of 100*l.* to the design under the motto and device, "Arms of Pembroke Coll., Oxon," and the second, of 50*l.*, to "Supervision." The first was found by the chairman, on opening the sealed envelope, to be by Mr. Henry Hall, F.R.I.B.A., London; and the latter by Messrs. R. & E. Conder, London.

THE ENGLISH IRON TRADE IN 1885.

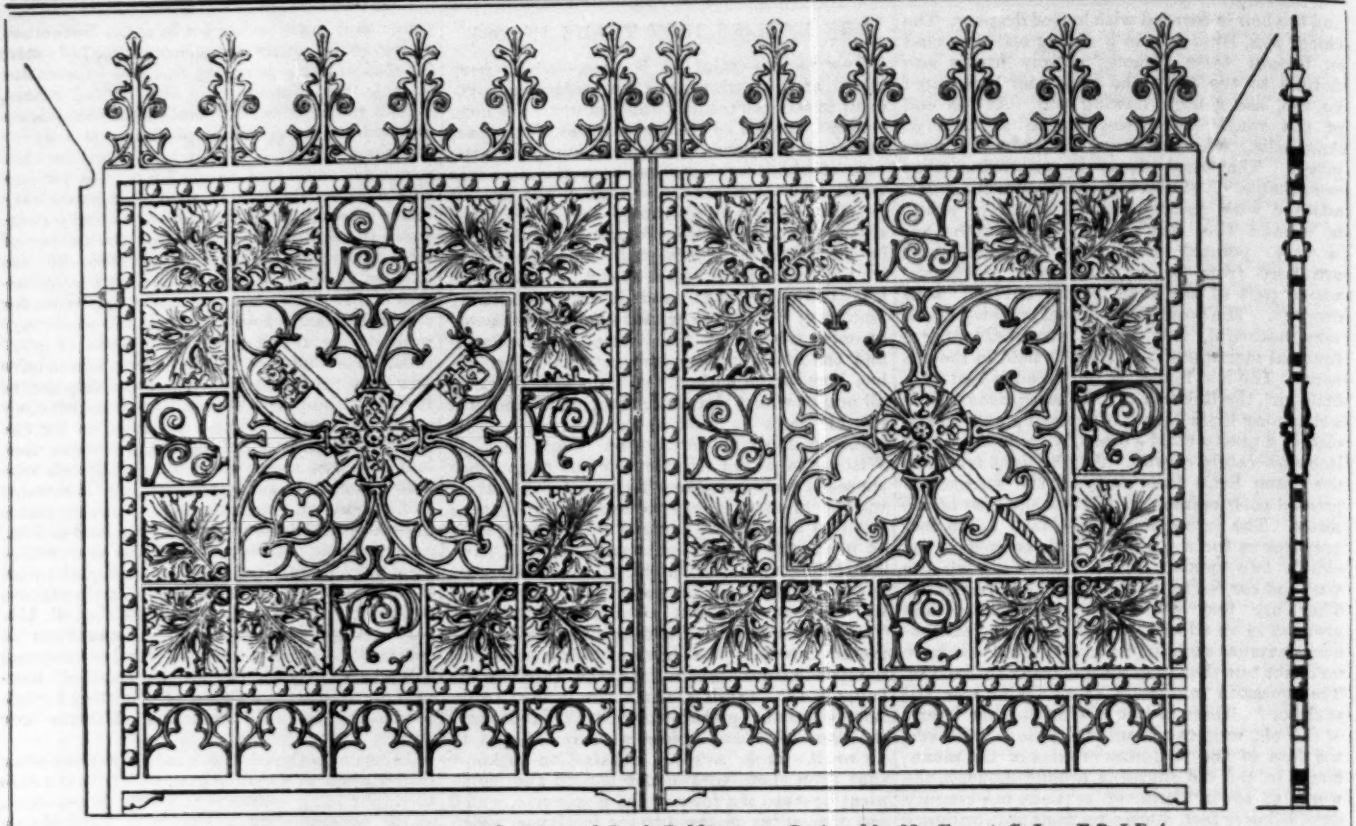
THE hopes,—faint, it is true,—which were raised at the beginning of 1885, of an improvement in the iron trade of this country, have been rudely dispelled by the experiences of the past year. Bad as was the preceding year, the year of which we have just seen the close was worse, and we do not know whether the present generation has passed through one in which the effects of bad trade were felt more keenly, both by employers and employed. In stating this, we have said the worst that can be said of the last twelve months, and it is a redeeming feature of the past year that the distress caused amongst the various branches of the iron trade and the related trades by want of employment has been borne with a fortitude that deserves all praise, whilst the philanthropic and practical efforts made to relieve the ensuing misery elicit commendation in an equal degree. Without inquiring too minutely into the various causes of the depression which has been characteristic of 1885, it may be broadly stated to be due to a diminishing demand on the part both of home and foreign consumers, as well as to a growing competition by foreign manufacturers, a competition unfortunately fostered by want of foresight of British producers. The International Railmakers' Association, for instance, which has been condemned by all independent journals in the trade, received the support of English manufacturers in the vain hope of enabling them to neutralise that competition. Warning voices were raised, but to no avail. It is a grim satisfaction to know that even those who countenanced the movement now see the folly of the manœuvre, which has opened up markets to the foreigner which were formerly closed to him.

The unfailing barometer of British trade, the Board of Trade Returns, fully corroborates what has been stated respecting the state of the English iron trade during 1885. The exports of iron and steel during the first eleven months of last year represented a total value of 20,128,374*l.*, as compared with 22,707,708*l.* in the corresponding period of 1884. As regards quantities, the exports were 2,910,347 tons last year, against 3,267,490 tons in the first eleven months of 1884. The great falling-off in shipbuilding during the past year has contributed in no small degree towards curtailing trade requirements, besides lowering the prices both of iron and steel. When it is considered that the total output of British shipyards in 1885 was reduced to 540,000 tons, as compared with 750,000 tons in 1884, and 1,250,000 tons in 1883, no surprise will be felt that this great decrease has affected the iron trade of this country most injuriously. The chief cause, however, of the prevailing depression in the English iron trade is still over-production. It need only be stated that the crude iron in stock at the present moment in Scotland and Cleveland alone is over 1,500,000 tons, against 1,221,000 tons at the beginning of 1885, and over two and a half million tons in the whole of the kingdom, and it will not need much eloquence to point a moral. The effect of such stupendous stocks upon the market is self-evident, and we can scarcely be surprised if the tendency throughout the past year has been for lower prices. It is true that Scotch pig-iron warrants have been remarkably uniform in value throughout the year, if we except a few trifling fluctuations, and that they are now quoted at nearly the same rate as at the opening of 1885, viz., 41s. 7d., against 42s. 2½d. But it is equally true that Scotch warrants are mostly in the hands of speculators, who, by keeping up the prices of the commodity they deal in, have contributed towards the comparative firmness of makers' iron without, however, benefiting Scotch ironmasters. For, owing to the dearness of Scotch iron, the floodgates of competition were opened to Cleveland makers, who have managed to place over 90,000 tons more of cheaper Middlesbrough iron in Scotland during the past year than in 1884. No. 3 Cleveland pig was worth, at the beginning of the year, 35s. 3d., prompt delivery, and it is now 31s. 9d.

The rates for crude iron in other parts have been in sympathy with those of the two principal producing districts, and this is true also of the trade in hematite pig-iron. The latter trade, however, notwithstanding the prevailing quietness, has been remarkably steady, no change worthy of note having taken place in quotations from July, 1884, to the end of 1885. An improvement in hematites set in about November, owing to the increased consumption of steel for shipbuilding purposes, and the expectation of a better demand from the United States. Whilst touching on the question of the greater demand for steel for shipbuilding, it may be mentioned that, if it had not been for the increasing wants of shipbuilders, the production of steel during the past year would have fallen off much more than it has actually done. From the statistics published of the output of steel during the first half of 1885, we are enabled to estimate the falling-off in the production of Bessemer steel at about 200,000 tons for the whole year, of which nearly the whole will probably be found to be on account of steel rails. The fact that English steel makers have now been producing ship plates and ship angles for some time, and the still more satisfactory announcement that they are going in for the manufacture of steel sleepers, are signs that better things are in store for the British iron trade, and this is, so far, encouraging. It remains to be added with regard to steel that ship plates of that material are now selling at about 6*l.* 10s., against 7*l.* at the beginning of the year, whilst steel angles are fetching 6*l.* 5s. compared with 6*l.* 10s. Steel rails have been sold throughout the year at the almost uniform rate of 4*l.* 15s. for average sections, and this steadiness is ascribed to the operation of the International Railmakers' Syndicate, at the sacrifice, however, as pointed out above, of admitting foreign manufacturers into markets hitherto our own.

Independently of the gradually proceeding substitution of steel for iron, which in the case of shipbuilding amounts to nearly 50 per cent. at the present time, the trade in finished iron has been much curtailed by a slackening demand, both home and foreign. In consequence, prices have suffered, but not to such an extent as might have been anticipated from decreasing inquiry. This, however, is solely due to the fact that prices were already so low at the beginning of the year that they could not decline much more, although manufacturers of finished iron were favoured by the cheapness of the crude material. Prices, however, tended downwards throughout the year, and at its end were about 7s. 6d. per ton lower than at the beginning. In the North of England, the average rate for iron rails, angles, plates, and bars at the beginning of the year was 4*l.* 18s. 11d., or 5s. 4d. less per ton than that touched in 1879, when it was 5*l.* 3s. 3d. At the last return presented in the year, in October, the net average price was 4*l.* 17s. 2d. In Staffordshire the quotable value of marked bars was 8*l.* 2s. 6d. down to 7*l.* 10s. in January. This has been the nominal quotation throughout the past year; but as a matter of fact most houses have taken shipping orders at from 10s. to 20s. below those rates, the depression in value being caused, as in the preceding year, by the competition of the cheaper North Country iron. In Lancashire the rates at which bars were quoted for delivery into the Manchester district were 5*l.* 10s. to 5*l.* 11s. 3d.; they are now 5*l.* 2s. 6d. to 5*l.* 5s.

Reference has already been made to the great decrease in shipbuilding; but as there is no cloud without its silver lining, we are justified in assuming,—and the assumption almost amounts to certainty,—that the reduced production of tonnage will tell in the end upon the freight market; for the loss of ships is constant, and shipbuilding, and through it the iron trade, must ultimately revive from this, if from no other, cause. Although not nearly so severely as the other branches of the iron trade, the engineering trades have suffered considerably during the past year. Marine engineers would be the first to feel a falling-off in ship construction; but, if we except locomotive builders and electric light engineers, engineers have had just cause to complain during the past year, a period during which they for the first time really felt the pinch of bad trade. Summing up briefly, it may be said that, taking into account the better outlook in shipbuilding, the revival of trade in the United States, the fact that industrial undertakings have been remiss in replacing old material owing to bad trade, and that long delayed renewals cannot be shirked much longer, the future does not appear nearly so dark as the past year has led people to anticipate. It is a satisfactory sign that English manufacturers are beginning to have their eyes opened by such occurrences as the formation of an international rail syndicate,



Brass Chancel Gates, Church of SS. Peter and Paul, Teddington.—Designed by Mr. Ernest C. Lee, F.R.I.B.A.

the indirect consequences of which will be felt yet for years to come; or the more recent Belgian girder incident, which has taught them that they are for the moment surpassed by foreign enterprise. We trust that they will profit in the future by the severe lesson they have received in the past.

ST. PETER AND ST. PAUL'S, TEDDINGTON:

BRASS CHANCEL GATES.

THE above church was erected under the direction of the late George Edmund Street, R.A. The gates have been designed to be as far as possible in character with his work. The emblems of the patron saints are introduced with their initials. The brasswork was executed by Messrs. Richardson, Slade, & Ellson, the model for leafage by Mr. Thomas Earp, all from full-size drawings by Mr. Ernest C. Lee, architect.

PROJECTED RAILWAY, TRAMWAY, GAS, WATER, DOCK, PIER, AND HARBOUR WORKS.

AN analysis of the 176 private Bills for the Parliamentary session of 1886 shows that of the railway Bills (fifty-six in number) eleven are promoted on behalf of companies proposed to be incorporated for the construction of entirely new lines in different parts of the country. These include a proposed line of railway from Bedford to Peterborough, commencing on the Midland line at Bromham, near Bedford, and terminating on the Northampton and Peterborough section of the London and North-Western line at Overton, in Huntingdonshire; a new line from the East Lincoln Railway, across the Lincolnshire marshes, to the main line of the Manchester, Sheffield, and Lincolnshire Company; a new line from the Eastbourne branch of the London, Brighton, and South Coast Railway to the Lewes and Seaford branch, with the view of effecting more direct railway communication between Brighton, Eastbourne, and Newhaven; a new line from Harrow to Great Stanmore; a new line from the Liverpool, Southport, and Preston line, now in course of construction, to Ormskirk; a new line in Lincolnshire, between Louth, Mablethorpe, and Willoughby; a new line from Woodstock, in Oxfordshire, to the Great Western main line; a new line in the county of Durham, called the West Durham and Tyne Railway; a new line, called the Nottingham Suburban Railway, intersecting the various suburbs around Nottingham; the Felixstowe, Ipswich, and Midlands Railway, a new line to connect the Great Eastern with the Midland line; and a new line from Portsmouth to Hayling Island, which would cross over a portion of tidal water, and reduce the distance between Portsmouth and Hayling Island as compared with the present route *vid* Havant. As regards existing lines, most of the leading companies have Bills seeking further powers for the construction of additional works, and amongst other new lines promoted by existing companies are those by the Rhymney Company for new lines in Glamorganshire and Monmouthshire; by the Mersey Railway Company for new lines in Liverpool and Birkenhead; by the London and Brighton Company for new lines at New Cross; by the Midland Company for a new line at Hendon; by the Taff Vale Company for new lines in the neighbourhood of Cardiff and Newport; by the Manchester, Sheffield, and Lincolnshire Company for new lines in Lancashire and Yorkshire; and by the Seacombe, Hoylake, and Deeside Company for several new lines in the Wirral district of Cheshire. The London, Tilbury, and Southend Company promote a Bill for powers to construct new wharves, warehouses, and landing-stages at Trobbery, near Tilbury; also containing powers to build on land near Tilbury Fort. The London and South-Western Company's Bill contains powers providing for the transfer to the company of the Wimbledon and West Metropolitan Company, and for an extension of time for the construction of the line. The Bill also seeks for powers to the company to construct the unabandoned portion of the Kingston and London line; and also powers to purchase houses and lands in the Parish of St. Mary, Lambeth, for widening the line and constructing a new station at Vauxhall. In connexion with the London and South-Western Company's Bill it should be stated that the Wimbledon and West Metropolitan Company likewise promote a Bill to compel the London and South-Western Company to construct so much of the railway authorised by the Kingston and London Railway Act as is situated between the Kingston line and Putney Bridge. It may be stated that the authorised Wimbledon and West Metropolitan line commences at Putney Bridge, by a junction with the Metropolitan District Railway at their Putney Bridge station. It then crosses the Thames by a bridge immediately eastward of the new Putney Bridge, now in course of construction by the Metropolitan Board of Works, and, continuing in a south-westerly direction, it enters Wimbledon Park, which is now being laid out for building purposes. At this point will be the Southfields Station, whilst some distance further south-west there will be another station called the Wimbledon Park Station, a short distance from the Merton-road, leading to Wandsworth. Continuing from this station the line finally forms a junction with the main line of the London and South-Western Company near the Wimbledon Station. On the completion and opening of this line railway communication between the metropolis and Wimbledon will be no longer confined to the London and South-Western Company.

The tramway projects, promoted by Bills, and also by provisional orders, are twenty-three in number, of which seven are undertakings connected with the metropolis. These include two Bills promoted by the North Metropolitan Tramway Company, one of which seeks powers for the construction of new lines in Clerkenwell-road, Theobald's-road, Vernon-place, Gray's Inn-road, Commercial-street, and Lewen-street, Whitechapel; and the other for extensions in Drayton Park, Gillespie-road, and Blackstock-road, and for the doubling of the line in Goswell-road. The South Metropolitan Company seek powers to lay down tramways from Clapham to Balham, Tooting, and Merton; by another Bill it is proposed to lay down tramways from Cricklewood to Kilburn, and Harrow-road; whilst the North London, the Southwark and Deptford, and the London, Highgate, and Finchley companies all apply for powers to extend their several systems. Amongst this class of Bills is one seeking powers to lay down several steam tramways in the districts in and around Manchester, Bury, Rochdale, and Oldham.

Gas and water undertakings are represented by twenty-five Bills and twenty-four applications for provisional orders. Of the entire number of this class of undertakings fourteen represent Bills empowering the incorporation of companies for the construction of new works, the remaining portion being applications in connexion with the extension of area of supply and existing works. In the Southwark and Vauxhall Water Company's Bill powers are sought for the construction of new reservoirs at Lewisham and West Moulsey, and for the building of bridges at Hampton. The East London Company's Bill contains clauses empowering the company to sink a well and erect pumping works at Waltham; also powers to construct an aqueduct, commencing at the well and pumping station, and carried under the main road from Waltham Abbey to Waltham Cross. The Lambeth Water Company's Bill seeks for powers to raise further capital.

The dock, harbour, and pier works projected are represented by twenty Bills and Board of Trade applications for provisional orders. The Southampton Corporation apply for powers to construct a new dock, embankment, and river-wall, and also for powers to divert, deepen, and dredge the waters of the Solent and the rivers Itchen and Test. The East and West India Dock Company promote a Bill applying for further capital to complete the Tilbury Docks, and for powers to erect and maintain hotels at Tilbury. The Preston Corporation apply for powers for a deviation of the authorised diversion of the river Ribble in connexion with the dock works now in course of construction at Preston. Powers are also sought for the construction of new docks and a railway at Gravesend and Northfleet. The proposal is to construct three new docks, including a main dock 380 yards in length, and 300 yards in width, with two branch docks, each 626 yards in length, and 100 yards in width, together with wharves and warehouses surrounding them. The project, if carried out, would absorb a portion of Rosherville Gardens. The entrance from the Thames to the docks would be near the Gardens. The area of the proposed main dock is nearly 24 acres in extent, and the two branch docks 13 acres each, the docks, wharves, and warehouses occupying an area of upwards of 80 acres. The Bill also seeks for powers to connect the docks with the South-Eastern Railway and the Gravesend branch of the London, Chatham, and Dover Railway, by a junction railway with those lines. The Southend Local Board promote a Bill with powers to purchase a portion of the foreshore of the river Thames for the purpose of constructing an embankment; also powers to construct new pier works, seaward, in continuation of the existing pier, together with the erection of refreshment and concert rooms at the end of it. Powers are also sought in the Bill to dredge and deepen the bed of the river. The Swansea Harbour Commissioners apply for powers to construct various new works, including a canal and additional locks. Powers are likewise sought to construct a sea wall and piers in connexion with the Bute docks at Cardiff, whilst the Cardiff, Avonmouth, and Burnham Railway and Steamer Company promote a Bill empowering them to construct new dock works near Avonmouth and Burnham. There is a Bill promoted by the Bristol Corporation for further dock works; also a Bill for the construction of a new bridge over the river Avon at Totterdown, near Bristol; and a Bill promoted by the Felixstow Dock and Railway representatives for powers to charter steam-vessels. A Bill is likewise promoted having for its object the improvement of the river Tyne. There are also applications for powers to construct new piers at Dovercourt, Tynemouth, Newlyn, Shanklin, Brading, and Sandown. Powers to make Channel Tunnel experiments are again sought by the South-Eastern Railway authorities. It may be added as having some connexion with harbour and sea-coast interests that the authorities at Lloyd's promote a Bill empowering them to erect, maintain, and work signal stations; also further powers as regards the collection, publication, and diffusion of intelligence.

There are twelve Bills relating to town improvements,—new streets, widening of existing streets, and increased sanitary powers, being the main features in the several Bills. The Liverpool Bill, in addition to the improvement powers thus sought, contains clauses relating to hospital enlargements, with powers to contribute 15,000*l.* towards the rebuilding of the Royal Infirmary. The Blackpool Corporation, in their Bill, have clauses enabling them to purchase the Blackpool Sea-water Company, and to widen the promenade or carriage-drive in front of the sea.

Amongst the Bills of a miscellaneous character is one promoted by the Lancashire County Justices for powers to construct a railway to the Whittingham Lunatic Asylum. Several Bills of this class have reference to projects affecting the metropolis. The Metropolitan Board of Works promote no fewer than six Bills, all of which may be classified under this head. Their General or Varied Purposes Bill empowers the Board to make several street and other improvements, and also enables the Board to make a staircase to form an access for foot passengers to the footway along the north-eastern side of the South-Eastern Railway bridge at Charing Cross. Authority is also sought in the Bill for further powers to the Board with regard to the use of subways under streets and other places in the metropolis. Another Bill promoted by the Board seeks powers for the enlargement of Hampstead Heath. The Board likewise promote a Bill empowering them to make further regulations in regard to theatres and music-halls. These two last-named Bills have already been referred to in the *Builder*. Of the three other Bills promoted by the Board, one has reference to the keeping and storage of firewood in the metropolis; another Bill provides for further powers to the Board in reference to Parliament by the Water Companies; whilst the other Bill provides for an alteration in the contributions by the insurance companies towards fire brigade expenses. The Corporation are the promoters of two Bills, one of which empowers them to alter and enlarge existing markets, whilst by the other Bill they apply for powers to purchase lands in Highgate, Hornsey, and Kilburn for forming open spaces. A Bill relating to the Muswell Hill Estate empowers a new company, proposed to be incorporated, to purchase the estate and the Alexandra Park Railway. One of the most important Bills promoted has reference to the purification of the river Lea. The Bill contains powers to compel the Tottenham Local Board to disinfect and purify the sewage matter passing into their works; prohibits effluent water and sewage from their works passing into the river and its tributaries; provides for the diversion of effluent water from such works into the sewers of the Hackney Local Board and the Metropolitan Board of Works; and also further provides for the construction of a sewer to connect the works of the Tottenham Board with the sewers of the Hackney Board. The Kensington Vestry seek powers to construct a depôt on land in that part of the parish known as the "Potteries," and to erect "destructors" and other machinery for the destruction and treatment of mud, dust, refuse of streets, and other waste materials of houses. The lands proposed to be purchased for the purpose contain an area of about four acres. The Horse Guards Avenue project for powers to form a new approach to the Thames Embankment, and the Bill promoted by the Charterhouse authorities, authorising the sale of a portion of the property, have both already been noticed in the *Builder*. A company proposed to be incorporated seeks powers for the construction of subways from Cromwell-road, South Kensington, to a point in the Brompton-road, near Knightsbridge-green, and thence to Oxford-street, near the Marble Arch. It is also proposed by the Bill to construct a new street from the north side of the Brompton-road to a point near the Cavalry Barracks, and to widen the Knightsbridge-road, on the south side. The Chelsea Electric Lighting Company promote a Bill empowering them to construct works and to lay down wires and other apparatus in various parts of Chelsea. The Greenwich and Millwall Subway Company promote a Bill for more capital, and for the transfer of the undertaking to the Metropolitan Board of Works. A Bill is likewise promoted with reference to the lighting of the new streets at Hyde Park Corner.

DEPRESSION IN THE BUILDING TRADES.

THE following is a statement sent in by the Institute of Builders, in reply to the questions propounded by the Royal Commission on Depression of Trade:—

The following statement relates to the building and general contracting trades chiefly carried on at home. Compared with the periods 1865–70, 1870–75, and 1875–80, these trades have been affected as follows:—During the last five years the imports have increased in volume in proportion, and manufactured goods have increased both in variety and volume. Profit has been reduced from good to vanishing point, the amount of capital invested being larger than in almost any other trade, and of late years vastly increased on account of the costly and varied machinery introduced. The labour employed is also larger than in any other single trade, but the number of men out of work since 1880 has been increasing, and it is at the present time larger than ever. Trade may be considered to have been at its normal level from 1875-80, above that level from 1870-75, and below it from 1880-85, and at the present time may certainly be described as depressed. The depression began in 1880, and has not reached the lowest point yet. Want of confidence and want of enterprise are its most prominent symptoms. Its progress has hitherto been uniform, but it is impossible to see the future, which, however, looks very bad. The special circumstances to which the existing condition can be attributed, are, too much outlay in speculative building, the existing system of ground-rents and building leases, the recent decisions by which the money lent by trustees on mortgages is limited, and want of confidence. The demand for capital is below the average of the last twenty years, the supply above, and the return on it is below that average. The rate of wages for skilled and unskilled labour is above the average of the last twenty years, both in relation to quality and quantity, and the mechanics have become more specialists, though the average is not so good. No special legislation for the benefit of the trade, apart from the welfare of the community, can be suggested. The present condition of the trade has not been affected by any changes in the relation between capital and labour, but to a very great extent in the hours of labour; it has not, however, been affected by changes in the relations between the producer, the distributor, and the consumer, fall in prices or appreciation of the standard of value, the state of the currency or the banking laws, the restriction or inflation of credit, over production or foreign competition. It has been affected by the highway laws and taxation of improvements, but not by communication with other markets.

PLUMBERS AND PARLIAMENT.

SIR,—I observed in a recent number of your journal a notice of a dinner given by the Plumbers' Company, where the Worshipful Master stated that the Company were desirous of reforming the trade and were seeking Parliamentary powers.

I do not know what these powers may be, but rumours are rife, and I would suggest that the Company should try to amend some of the difficulties and anomalies which now exist, rather than hedge the trade round with further restrictions or make it a stronger trade's union than it is.

Speaking from a builder's point of view the plumbers are the most troublesome, and cause more loss and anxiety than all the other trades employed by us.

They begin work at a later hour than other trades.

In the winter they take one hour to dinner, while all the other trades are satisfied with half an hour.

They leave off work half an hour later, thus entailing the necessity of foreman or watchman remaining too.

They do less work and receive more wages than other equally intelligent mechanics.

If the two or three master plumbers who represent the trade on the Court of the Plumbers' Guild will address themselves to practical questions like the above, they will do some good for, and earn the gratitude of, the whole country.

I hear that our Builders' Association wrote to the clerk of the Company last August, asking that it might be represented at any conference, but up to now no answer has been vouchsafed.

Perhaps this is wise, as doubtless the gentlemen, who remind one somewhat of the three mighty men from Tooley-street, anticipated opposition; but if they will only go in for wise and practical proposals, they may depend on the cordial support of the builders, who, by the way, employ by far the largest number of hands.

C. A. M. B.

Leeds and Yorkshire Architectural Society.—The following is a list of recently-elected honorary members of this society, viz.:—The Marquis of Ripon; Mr. B. Priestley, M.P.; Mr. S. W. Duncan, Horsforth Hall; Mr. Alderman John Baynes, Mayor of Ripon; Rev. John Gott, D.D.; Mr. John Barran; Professor Bodington, M.A. (Principal, Yorkshire College, Leeds); Mr. J. S. Mathers; Mr. Ernest H. Jacob, M.D.; Mr. H. B. Hewetson, M.R.C.S. Eng.; Mr. W. Irwin (all of Leeds); and Mr. J. M. Barwick, M.A., Yeadon.

"THE ROYAL INSTITUTE OF BRITISH ARCHITECTS."

SIR,—In the discussions now going on for the improvement of the Royal Institute, I have not seen any suggestions for the improvement of the name. Although the name is a secondary matter, it need not be left out of consideration, as I doubt if there exists a clumsier title among any of the other royal societies. The coupling of the words "Institute" and "British" are difficult enough of pronunciation even for a sober man, however they might sound in a hilarious song; and the initial letters which the title obliges a man to use after his name are nothing if not comical. Did ever a man write F.R.I.B.A. after his name with a serious face on? The substitution of the simple word "Guild" for "Institute of British," making the title "The Royal Guild of Architects," would, in my opinion, adequately express the purpose and aim of the Society, and the initials F.R.G.A. would not, I think, conflict with any other royal society. Guilds are associated with trades of which the architect is the master workman in the building trade, and according to Spenser they are "an association of men belonging to the same class, or engaged in kindred pursuits, formed for mutual aid and protection; a business fraternity; and were originally licensed by the Government, and endowed with special privileges and authority." This definition practically expresses the *raison d'être* of the Institute.

J. M. MACLAREN.

WHAT IS A BILL OF QUANTITIES?

SIR,—In response to an advertisement in your paper of Dec. 19th, stating that tenders were required for the erection of an institute at Slough, near Windsor, I duly applied for particulars, and received in due course a bill of quantities (at least, so-called); these were, I presume, prepared by the architect, as no surveyor's name is attached thereto.

The proposed building is of a highly decorative style, both inside and outside, and the quantities do not, to my mind, at all represent the work required to be executed to enable a builder to realise what is required to prepare an estimate. I will instance a few items:—"600 yards super. extra to best red pressed brick facing and weather pointing, with neat black joint, face and soffit measured." This has (on reference to the plan) to include small gable, pediment, octagon cut turrets, and a lot more ornamental work.

In "Mason" we have "2,000 ft. cube Bath stone from the Box quarries for external and internal work, except steps, paving, &c., which are to be in York stone as per specification; the whole to be worked to drawings in the best manner, fixed, and cleaned down at completion." Here we have all the stone mixed up in one item; this is all the information given as to mason's work.

In "Carpenter," we have "2,200 ft. cube Baltic red fir in sleepers, lintels, joists, principals, strutting, grounds, &c." This has to include work to curved principals, hammer-beams, and all the difficult construction of a 35 ft. span roof, full of gables, and a high and heavy turret.

In "Joiner," we have "370 ft. run 1½ in. moulded and panelled dado, with diamond raised panels, 3 ft. 3 in. high over all, having 4 in. by 3½ in. moulded capping, 5 in. by 1½ in. frieze and 9 in. by 1½ in. skirting, to include all grounds." Not a word about mitres, of which there are about sixty in this item.

There is no bill for "Painter." This is to be priced in the wood and iron work inclusive, and the wood work is to be decorated.

This is somewhat the nature of the bill of quantities, and for this the builder is to add 2½ per cent. for quantities. I should much like to know who would be responsible to the builder in the event of his getting the work on such an unrepresentative bill of quantities, because when the contract was carried out the work would be much in excess of what a builder could be fairly expected to estimate for by this bill. My idea of a bill of quantities is that it should fully express the work without reference to the plan and specification.

I enclose the bill of quantities for your inspection.

A SUBURBAN BUILDER.

December 30th, 1885.

TIMBER MEASUREMENT.

SIR,—I have a trunk of an oak tree which measures 15 ft. long and 9 ft. girth round the middle.

Now, considering this a cylinder, the cubical content is 96 ft. Supposing it squared and the outsides neglected, the content is 61½ ft.

If it be considered as slightly tapering,—in mathematical language, a truncated cone,—the two contents will each be slightly greater than those found.

Now, why do the sliding-rule and the tables used by timber merchants make it to be 75 ft.?

I cannot make it this either by taking twenty-five per cent. from the gross measure for waste, or any other way.

Can any of your readers help me?

J. WARDALE.

NON-ACCEPTANCE OF LOWEST TENDER.

SIR,—Referring to Mr. J. Greenwood's letter in your issue of the 26th ult. [p. 914], I beg to say that the Central Association of Master Builders of London has for some time past had under consideration the subject of the non-acceptance of the lowest tender.

E. S. HENSHAW,
Secretary of the Central Association of Master Builders of London.

31, *Bedford-street, Strand, Dec.* 30.

SIR,—In your paper for December 12 [p. 842] there is a letter from Mr. Higgs, justly complaining of the rejection of a tender of his (the lowest by 1*l.*) for some work at a bank, in favour of the next highest one, and we have to ask you to allow us space to bring to the notice of your readers a similar case in which we are the victims.

In November last, we were invited by Mr. C. J. Dawson, architect, of Barking (and Surveyor to the Local Board there), to submit a tender for a malt-store, to be erected alongside the creek in that town, for Messrs. Randell, Howells, & Co., of 25, Mark-lane, City. Having accepted the invitation, and in due time received a copy of the quantities, we, on the 18th of December, sent in a tender, and on the 23rd received a letter from Mr. Dawson thanking us "for the trouble you have had in tendering for the work, a list of tenders for which I append." These were as follows:—

Mowlem & Co.	£4,189	Cunliffe	£3,913
Clarke & Bracey	3,999	Nightingale	3,876
Morter	3,693	Smith (accepted)	3,818
Brass & Son	3,983	Rider & Son	3,778

We at once wrote to both the employers and the architect, and the former replied that "they believed they had acted quite within their rights," and the latter informed us that "as Mr. Smith had already commenced the building in question by erecting the most difficult portion of it, viz., the wall next the river" (completed some time since), "and that, taking into consideration such work had been unremunerative to him, they thought, as the difference (90*l.*) was so slight, *they could not do otherwise* than accept Mr. Smith's tender."

Although the usual clause about non-acceptance of the lowest or any tender was conspicuously absent in both the invitation and also in the quantities, we suppose we have no legal remedy; but it certainly seems monstrously unfair that we should have to waste time and money in making calculations simply for the purpose of checking the estimate of a more favoured competitor. We have communicated with the other builders who tendered to ascertain their views on the subject, and desire, by the medium of your columns, to make known to the trade another instance of a too-frequently recurring custom. We also intend to bring the matter before the Council of the Builders' Institute and the Central Association of London Builders, asking them to consider if any steps can be taken to prevent such treatment in a business already harassed by an exaggerated competition and exposed to enormous risks, difficulties, and annoyances.

THOMAS RIDER & SON.

181, *Union-street, Southwark.*
December 30th.

VENTILATION.

SIR,—My communication on this matter to *Nature*, referred to in your last issue, was a simple statement that I had tried in practice a system of ventilation strongly recommended by a writer in that paper; and I stated that the system as described was a total failure. I cannot see that either the statement or the result was "curious"; and in reply to your query as to whether I have any fresh-air inlet proportionate to the combined areas of the flue and ventilating shaft, I am happy to say I have not. As these shafts are about 9 in. square each, I should require, for the fourteen rooms the house contains, a fresh-air inlet large enough to run an ordinary hand-cart through, and there would probably be a calmer atmosphere outside the house than inside. To put a sufficient air-inlet in part of the rooms would be useless, as the pull of each flue in the house acts more or less in each and every room. The fresh-air inlet to each room consists of a channel to the outside wall, with ten 1 in. holes opening at the fireplace: this is, of course, in addition to door and window leakages, which are usually the only fresh-air inlets provided.

As flues have to be built with room for accumulation of soot and for sweeping, they are of necessity large; and, if a supply of air, equivalent to the possible demands of a tall 9 by 9 vertical flue, is to be admitted to a room, say 15 ft. by 20 ft., the air in the room would probably not be warmer than outside, and the atmosphere would be about as free from draught as a shady corner in the garden. It is the fact that a sufficient air supply for both flues cannot in practice be admitted to the room, which makes the system as recommended a failure. As I had tried it, and I am pretty certain the writer had not done so, I simply recorded the fact of its failure in practice. The reason of the failure was, I thought, evident; and, if flues from the ceiling are to be adopted, they must apparently be accompanied by an apparatus which will deliver into the house an enormous volume of warmed air, as the admission of cold air in sufficient quantities is simply out of the question.

Warrington. THOS. FLETCHER.

TALL CHIMNEY CONSTRUCTION.

SIR,—Will you allow me to make two or three practical inquiries respecting the construction of chimney shafts, viz.:—

What advantage shall I reap by using a portion of Portland cement in mortar, and what proportion of cement to lime and sand is best?

Will hydraulic lime give better results than ordinary stone lime?

Which would be best to use in constructing flues to carry hot gases to chimney,—brickwork in cement or brickwork in mortar?

I notice in Messrs. Bancroft's work on "Tall Chimney Construction," advertised in the *Builder*, that some builders use ordinary stone lime, some hydraulic lime, and others chalk lime with a little Portland cement added; my object in writing is to ascertain which is best.

T. SUMMERS.

CHURCH-BUILDING NEWS.

Althorne.—The Church of St. Andrew, at Althorne, Essex, has lately undergone some extensive repairs, and, with the exception of the tower, is now in a permanently safe and substantial condition. The principal works have been the rebuilding of parts of the north and south walls of the nave, the insertion of new windows, and a new roof. A monumental brass in the nave floor records that the walls of this church were rebuilt by William Hyklott, who died in 1508. They are of rubble and flint, about 2 ft. 6 in. thick, but, owing to insufficient foundations and the fact that the subsoil is clay, they had settled in rather a remarkable way, viz., east and west (not out of the perpendicular), causing large vertical fractures through which the rain and weather entered freely. Indeed, so dilapidated and apparently hopeless was the condition of the fabric that it had been condemned as being beyond restoration and its demolition had even been advised. By means, however, of designs prepared by the architect, the most necessary works have been carried out, at a cost of about 380*l.* The tower, an imposing structure of the fifteenth century, is still in a most dilapidated and crumbling condition. Funds are urgently needed for the restoration of this, estimated to cost about 300*l.* The architect was Mr. H. Hardwicke Langston, of London, and the contractor Mr. Charles Read, of Burnham. The chancel, which was a brick and lath-and-plaster construction, has likewise been substantially repaired and improved; the old brickwork which was sound has been retained, the walls have been raised, and handsome stone traceried windows have been inserted in the east and north and south walls; also a new open timbered roof, the floor raised and tiled, and the interior fitted with choir seating. This work has been carried out at the sole cost of the Governors of St. Bartholomew's Hospital, Mr. Edward I'Anson and Mr. Langston having been joint architects for this portion of the work. There was no formal re-opening. The works were completed in December.

East Dereham (Norfolk).—The parish church of St. Nicholas, East Dereham, in which was buried the poet Cowper, has been re-opened, after complete restoration of the nave and aisles. The works to the Early English nave roof comprised removal of the eighteenth-century plaster ceiling and the repair of the existing oak roof, and an inner ceiling of pitch-pine boarding and intersecting ribs, and 108 carved bosses of oak. The old lead was taken off and entirely re-cast. The plaster has been removed from the north (Decorated) and south (Early English) aisle roofs, and the spandrels of the former roof have been filled in with new tracery. At the foot of each brace new shields are to be fixed, carrying emblems of the saints associated with the Eastern Counties. The old galleries which blocked up the north and south aisles and the west end of the church have been removed, and the celebrated Perpendicular font, which was previously in the north transept, has been replaced in its original position near the west door. All the windows in this part of the church, including the great west window, have been thoroughly repaired in stonework, and re-glazed in tinted quarry glass. In this process

some beautiful tracery in the windows of the north aisles have been opened out. All the walls have been re-stuccoed, and the south porch,—an excellent piece of work illustrated by Cotman,—has been repaired. The clearstory windows were formerly very plain and cold in appearance, but the old plaster mouldings have been removed, and new quoins and inner arches of stone have been inserted, and the windows reglazed. The church has been laid with hot-water pipes throughout on the low pressure system. These have been supplied by Messrs. Jones & Co., London. The former gas-standards have been removed, and coronæ (by Messrs. Bradley & Co., of East Dereham) fixed on the top of the columns. The constructive work has been performed by Messrs. Cornish & Gaymer, of North Walsham, and the whole of the works have been completed from the designs and under the superintendence of Mr. Edward Preston Willins, architect, of Norwich.

The Student's Column.

FOUNDATIONS.—I.

THE term "Foundations" has received a legal definition. By the Metropolitan Management and Building Acts (Amendment Act), 1878, it is interpreted as meaning "the space immediately beneath the footings of a wall." This definition is made for the special purpose of fixing the circumstances under which the use of concrete shall be compulsory within the Metropolitan district, and the smallest quantity of it that will satisfy the requirements of the by-laws made under the Act. We shall see, in due course, how this matter is dealt with on this strictly legal basis.

But the subject of foundations cannot, in practice, be so strictly limited. It includes everything that relates to the ground upon which the walls and piers of a building have to stand, and all kinds of preparation that may be required in order to make a bad or indifferent site sufficiently sound and firm for the purpose of being built upon. It is a subject that, beyond most others, requires careful personal observation and experience in order to the formation of a sound judgment in any particular case. Indeed, the student should understand that no written instructions can be of material use to him unless he seizes every opportunity of inspecting excavations and modes of dealing with unsuitable soils in the practical operations of the builder. A good knowledge of geology will be found of great utility, but the following details of the chief kinds of soil in which foundations have to be made may be sufficient as an introduction to the study of the subject.

THE VIRGIN SOIL.

In the open country, the surface soil, to a depth of from 9 in. to 18 in., has been more or less disturbed by plough or spade, and consists of the soil that may be common in the locality, mixed to a very large extent with vegetable matter resulting from the crops that have grown upon it, and with various kinds of manure. Below this depth we find the virgin soil, otherwise called the maiden earth, consisting of matter that has never been disturbed in human history. Whatever may be the nature of this *subsoil*, its ingredients have almost certainly been brought, at very remote periods, to their present position, by the action of water. They have been deposited either gently as a sediment in a quiet sea or lake, or heaped together more or less violently by the strong currents of rivers or the breakers of a sea-shore. Sand may have been drifted by the wind just as it is now being drifted on certain of our coasts. Rocks, except a very limited number that have been melted by heat, have been deposited in the condition of soft ooze or of sand, bed upon bed; some interruption in the process, or some thin layer of a different material having caused these horizontal divisions. These beds have gradually become hard, and have usually been tilted up at various angles, broken, and often buckled and twisted into forms and positions of great irregularity. While these movements (caused by subterranean forces acting slowly through long periods) were going on, other beds of gravel, sand, clay, or mud, or of such materials mixed together, have been deposited upon the hardened rocks, and have partaken of the continuing movements of these rocks. Portions of these soft beds have been washed away, and new deposits made over the disturbed surfaces. Layers of vegetable matter have been formed in shallow water, and have decayed into peat, to be covered up with fresh beds of clay or mud. All these beds are likely to be thick in one place, and gradually to become thin and disappear, or to be cut off suddenly, so that within a small area the subsoil will vary considerably, and soft or spongy layers will be found under others that are comparatively hard and might seem perfectly reliable.

These phenomena can be easily seen and should be carefully studied in ordinary excavations, in railway cuttings, and in sea cliffs, but a very good idea of them may be formed by observing the deposit of *débris* brought down the channels of a muddy road after a heavy shower. There we may see beds of mud, sand, and gravel sorted according to the size and weight of their particles, and imitating on a small scale by the work of an hour the processes and results that have taken thousands of years to accomplish on the larger scale that we have now in view.

SKETCH SECTION OF BEDS DEPOSITED BY WATER

We may now consider these different kinds of subsoil in detail.

Rock as a foundation has a security that is proverbial. If its surface is not level it must be levelled or cut into steps to receive the footings or base of a wall. It is necessary to ascertain that the rock does not consist of a kind of shale that turns to mud when exposed to air and moisture. It is also necessary to see that the whole building stands upon the same kind of foundation, for if some part of it is on a soft and yielding foundation there will be a fracture over the place where the change in the nature of the foundation takes place.

Gravel is upon the whole the most satisfactory of natural foundations. It varies considerably in the size of the stones, their shape, and the proportion of large to small stones. The spaces between the stones are usually filled in with smaller pebbles and sand; a small proportion of clay helps to bind the whole into a solid mass. The rough flint gravels of the London district are of this class, and are very suitable for foundations.

Sand forms a good firm foundation so long as it can be kept in its position. A very slight proportion of clay with the sand makes it stand well in excavations. Sand that is clean and loosely held together may easily be made to slip away from under a foundation if a trench is dug too near to it. Fine sand that lies below the level of the water in the soil will behave very much like a fluid when an excavation is made in it. It is known as "running" sand. If a well is dug in such a stratum near to the foundation of a building the sand may escape into the well so as to undermine the walls.

Clay, when it exists in a thick bed, is very hard, firm, and comparatively dry, so that it can only be dug with difficulty. In that condition it is capable of bearing very considerable weight, but within 4 ft. or 6 ft. of the surface it is so much affected by changes in the degree of moisture as to render it a very treacherous foundation. It swells considerably when wet and shrinks when dry, so as to be intersected by wide and deep cracks. In places where water settles it is pasty, and yields to pressure, and the purer it is the more it is subject to these objections.

Silt is a soft deposit from muddy water, and when it is below the level of the subsoil water is without cohesion or firmness, so that a wall would sink bodily into it. It is found where rivers that carry down large quantities of earthy matter broaden out into a lake or estuary, where the still water can deposit its impurities over a large area. The process is still going on near the mouths of all large muddy rivers, and some of the most important engineering undertakings have been necessary in order to provide foundations in such a subsoil.

Peat is often found lying in strata below the soil in marshy districts. When a heavy load is placed upon it, the water is squeezed out of it, and it becomes compressed so that an artificial foundation must be formed for any building of importance on such a site.

We must remember the conditions under which these beds have been deposited. They are sometimes tolerably level, of uniform composition, and of very great thickness, but frequently they are not only of irregular thickness and inclination, but of different materials mixed together. Thus clay is mixed with sand, making *loam*, which is more reliable as a foundation than clay alone. The addition of clay makes loamy sand, and loamy gravel, and lime added to clay forms *marl*,—a compound that is often very hard, but changeable when exposed to air and moisture. To sum up this part of our subject, we may say that, as the result of natural operations, the details of which cannot be precisely known, the soil in which a foundation has to be obtained must always be to some extent uncertain until the excavation is made. Yet a knowledge of such conditions as are possible, combined with a fair amount of experience, will enable one to judge beforehand of what is probable, and so to be prepared for dealing with the conditions that are found actually to exist.

VARIORUM.

"THE Bernese Oberland: Twelve Scenes among its Peaks and Lakes," by Elijah Walton, F.G.S., with descriptive text by T. G. Bonney, M.A., F.S.A., &c. (London: Published by W. M. Thompson), is a handsome volume, containing twelve plates from the drawings of Mr. Walton, executed in chromolithography by Messrs. Wyman & Sons, giving some of the most striking scenes in the district which it illustrates. The colouring of some of the scenes strikes us as rather "high"; whether this is due to the original drawings, or the reproduction in chromolithography, we cannot say. Some are very successful. The text is better written and of more interest than is usual in works of this class.——"Ye Earlie English Almanack: 1886" (published by Pettitt & Co.), is a very pretty little "sham-antique," with old-fashioned woodcuts and page ornaments, and some curious odds and ends of reading. As an antiquarian jest, it is well done, and a good sixpennyworth.——Messrs. Letts, Son, & Co., Limited, of King William-street, have sent us a parcel containing a varied assortment of their excellent diaries, date-tablets, and housekeeping books. The quarto "Office Diary," No. 1, which is provided with an index, will be found very serviceable; Nos. 8, 9, and 11 are good specimens of the octavo series of the same diary. Nos. 24, 26, and 27 are cheap varieties for the pocket. Letts's "Rough Diary or Scribbling Journal" is, in spite of its name, a very well-finished diary, the printing, paper, and general get-up being excellent. This diary is folio size, and in one form it is interleaved with blotting-paper. Nos. 35 and 36 are specimens of the same diary in octavo size. No. 37, the "Universal Diary," interleaved with blotting-paper, is a very good and cheap scribbling diary, selling for a shilling. Letts's "Clerical Diary" and the "Clerical Tablet Diary" are sure to find favour with the clergy, while the "Housekeeper's Books" seem to meet all possible requirements.——*Walford's Antiquarian* for January commences a new volume. The first article, on "Brighthelmstone," is by the editor, Mr. Edward Walford, M.A., and contains an interesting account of the curious land divisions and subdivisions which formerly obtained, and to some extent still survive, in Brighton. The other contents go to make up a very good number.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

7,675, Water Cistern. R. Pringle.

The inlet pipe is turned up at the end, and provided with a spreader to prevent the disturbance of the deposit. The outlet pipe is fixed with its mouth a little above the level of the inlet. The bottom of the cistern slopes to prevent deposit.

12,888, Bricks and Building Blocks. W. B. Smith.

The bricks are formed so that when laid they cross each other obliquely, each brick bonding with a larger number of others than is usual: in addition to which they may be bound together by tie-rods, or by joggles. They are of about the proportions of an ordinary brick, the difference being that, instead of being rectangular they are oblique-angled, and have a hole near each end. Special bricks are made for ends of walls or for the junction of walls meeting at right angles. The bricks are likewise suitable for building straight arches. The invention is applicable not only to bricks, but to other descriptions of building blocks.

13,459, Gully and other Traps. S. Phillips and J. Millier.

The ordinary-fixed dip of gully and other traps is replaced by a separate one, which slides in vertical grooves. The grooves are filled with tallow to make them gas and water tight.

14,362, Parquet Flooring, Floors, and Ceilings. F. Guerin.

The strips or boards are formed with grooves in the sides which fit over feathers, through which screws are passed into the joists. The feathers may take the form of T or double T irons, or they may be of wood. A modification is to employ strips or boards having a groove only on one side and pins or dowels on the other fitting into the grooves in the adjacent piece. Where the parquetry comes next to walls or partitions, the pieces may be let into a strip of wood, the top of which is flush with the surface of the floor. The parquet blocks may be of sufficient thickness, and may be so connected between rolled joists by dowels and pins as to form, at the same time, both a parquet floor and a parquet ceiling. In that case the blocks may be shaped so as to envelope and hide the flanges of the joist.

NEW APPLICATIONS FOR PATENTS.

Dec. 18.—15,545, J. McConachy, Improvements in Ventilators or Air Valves.—15,553, W. Atkins, Improved Door Bolt.—15,554, A. Harris, Ventilation of Sewers.—15,559, H. Townsend, Electric Bell Punches, Pulls, &c.—15,560, J. Arnot, Manufacture of Sunk Slide Flush and Knob Bolts for Doors, &c.—15,577, R. Brown, Improved Batten Nail.—15,587, F. Howcroft, Sash Holder.—15,608, D. & E. Glaister, Improvements in Movable Partitions, Doors, Window Sashes, &c.—15,609, D. & E. Glaister, Apparatus for Securing Doors so that the Fastenings are Automatically relieved.

Dec. 19.—15,613, T. Gray, Improvements in Door Locks.—15,650, G. Ayers, Improved Locking Device—15,677, R. Barker, Revolving Coupling Joint for Water, Gas, and other Pipes.

Dec. 21.—15,684, G. Sowerby, Improvements in Lead Glazing.—15,689, H. Stockman, Improvements in Concrete-mixing Machines.—15,725, G. Tagg, Improved Air and Water Tight Seam or Joint for Constructional Wood and other Work.

Dec. 22.—15,751, W. Joy, Improvements in the Method of Charging Cement Kilns.—15,752, P. Lawson, New Anti-fouling and Anti-corrosive Enamel Paint.

Dec. 23.—15,811, W. Dorhring, Apparatus for Cleaning Chimneys, Flues, &c.—15,820, E. Pither, Door Shields or Finger-plates.

PROVISIONAL SPECIFICATIONS ACCEPTED.

9,090, D. Thomas, Improvements in Screws and Screw Drivers.—10,717, S. Henshaw, Improved Fastening for Doors and Windows.—13,497, R. Hunter, Self-acting Stop Lift for Window Sashes.—13,692, C. Parsons, Combined Wood Sawing and Slicing Machines.—13,748, E. Horsley, Improvements in Window Fasteners.—13,899, T. Goldsmith, Improved Screw.—14,023, T. Paxton, Attaching Door Knobs to Spindles.—14,113, J. Honeyman, Improvements in Ventilators.—14,234, J. Keith, Improved System for Heating and Ventilating Cellular Buildings.—14,236, W. MacVitie, Adjusting Door Knobs and Handles to Spindles.—14,550, H. Joel, Utilisation of Gas Fittings for the Electric Light.—14,775, R. Legg, Improvements in Stall Boards for Shop Windows.—14,793, W. Scott Morton, Apparatus for Embossing Canvas for Decorating Walls, &c.—14,907, C. Hodges, Improved Lamp-post.—15,134, A. MacLean and R. Smith, Preparation of Coloured Varnishes.—15,135, A. MacLean and R. Smith, Manufacture of Pigments.—13,328, T. Smith, Manufacture of Cements, &c.—14,695, C. Carson, Electrical Apparatus for Releasing Door and Similar Fastenings.—14,816, C. Gumpel, Friction Clutch for Holding Window Sashes and other Sliding Frames in any desired position.—14,951, J. Davis, Supporting Vertically-sliding Window Sashes and Shutters in their Frames.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

16,817, R. Adams, Improvements in the Method of Opening and Closing Fanlights, Skylights, Ventilators, &c.—2,306, H. Hunt, Improvements in Kitcheners.—2,364, P. Hannay, Improvements in Water-closet Seats or Covers.—2,648, W. Hayhurst, Improvements in Cramps for Carpenters and Joiners.—2,859, L. Bickley and J. Winn, Improved Paint Brush.—3,512, E. Summerfield, Adjusting and Fixing Door Knobs to Spindles.—9,422, W. Boulton, Improvements in Decorating Glass.—12,510, R. Mason, Improvements in Windows.—13,638, T. Newey, Door and Window Fasteners.—1,983, H. Gresham, Security Stops or Catches for Windows, &c.—12,191, A. Clark, Window-sash Holders.

MEETINGS.

FRIDAY, JANUARY 1.

Architectural Association—Mr. E. C. Robins on "Various Theories Concerning the Form and Style of the Temple of Solomon." 7·30 p.m.

SATURDAY, JANUARY 2.

Association of Public Sanitary Inspectors.—Mr. James Bateman, C.E., on "The Pollution of Rural Water Supplies." 6 p.m.

MONDAY, JANUARY 4.

Royal Academy of Arts.—Mr. J. E. Hodgson, R.A., on "Dutch Painters of the Seventeenth Century." 8 p.m.

London Institution.—Mr. Edwin Freshfield, F.S.A., on Christian Constantinople." 5 p.m.

Victoria Institute.—Mr. W. St. Chad Boscawen on "Newly-Discovered Inscriptions with reference to the Migration of Abram." 8 p.m.

Clerks of Works' Association.—Mr. E. A. Bernays, M.Inst.E.C., on "Portland Cement and some of its Uses." 8 p.m.

TUESDAY, JANUARY 4.

Manchester Architectural Association.—Mr. J. S. Hodgson on "Architectural Ethnography." 7·30 p.m.

WEDNESDAY, JANUARY 6.

British Archæological Association.—(1). Mr. J. Romilly Allen on "The Sculpture of the Norman Doorway at Absie, Yorkshire." (2). Mr. J. W. Grover on "The Discovery of the Monuments of the Atkins Family at Clapham." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting. 8·30 p.m.

THURSDAY, JANUARY 7.

Royal Academy of Arts.—Mr. J. E. Hodgson, R.A., on "Painters of the French School." 8 p.m.

Edinburgh Architectural Association.—Short papers on Current Topics. 8·30 p.m.

Miscellanea.

Royal Institution of Great Britain.—Among the "probable arrangements" for the Friday evening meetings before Easter, 1886, are the following:—Friday, Feb. 5th, Mr. T. Pridgin Teale, M.A., F.R.C.S., on "The Principles of Domestic Fire-place Construction." Friday, March 12th, Mr. Reginald Stuart Poole, LL.D., on "The Discovery of the Biblical Cities of Egypt." Friday, March 19th, Mr. W. H. M. Christie, M.A., F.R.S, Astronomer Royal, on "Universal Time." Friday, April 9th, Mr. William Anderson, M. Inst. C.E., on "New Applications of the Mechanical Properties of Cork to the Arts." The other lecture arrangements include the following:—Mr. Reginald Stuart Poole, LL.D., of the British Museum. Three lectures on Naucratis: (1) Relations of the Greeks with Egypt from the Heroic Age to Psammetichos; (2) The Emporium of Naucratis; (3) The Egyptian Sources of Greek Art. On Tuesdays, Jan. 26, Feb. 2, 9. Prof. Charles T. Newton, C.B., LL.D., M.A. Three lectures on the Unexhibited Portion of the Greek and Roman Sculptures in the British Museum (illustrated by drawings and casts). On Tuesdays, Feb. 16, 23, March 2. The Rev. C. Taylor, D.D., Master of St. John's College, Cambridge. Two lectures on the History of Geometry: the Greeks and the Moderns. On Saturdays, Feb. 27, March 6. Professor Oliver Lodge, D.Sc. Two lectures on Fuel and Smoke. On Saturdays, April 10 and 17.

Christmas at Exeter.—Mr. Councillor Hems (better known, perhaps, as Mr. Harry Hems) invited a large number of poor old men and women to his customary Christmas dinner, which was served in his wood-workers' shop, on Christmas Day. Mr. Hems seems to have been characteristically energetic in administering to the enjoyment of his guests.

Royal School of Mines.—Prof. Warington Smyth, F.R.S., in continuing his lectures in the theatre of the Geological Museum, Jermyn-street, dwelt at length upon the various means adopted for the discovery of displaced lodes. The simplest mode of determining where the continuation of the lode lies is to assume the generalisation that the lost part of the lode is lower on the side of the hanging wall of the dislocator, and this is practically the same rule which applies to stratified deposits referred to in a previous lecture. To this rule, however, as in the case of beds, there are exceptions; but, after paying great attention to these exceptional cases, he found that forty-nine cases out of fifty held good. The exceptions occur where the underlie is very flat, as illustrated in the district of St. Agnes, in Cornwall, where a great number of dislocations occur, and almost invariably have the effect of heaving the lode; and there are instances where one lode has been brought to the surface two or three times; but complications of this kind may be quite unknown in another district. Heaves and displacement may, and frequently do, result from contact with cross-courses, which form a plane down which the lode may slip, in which case it is important to know which way to work in order to fall in with the displaced lode again. Miners call these cross-courses guides, because, by following them, veins coming in contact with them may be met. Mr. Henwood, in some reliable observations, concludes that of a very large number of lodes which he examined, 22·7 per cent. were intersected by cross-courses and not heaved; the proportion heaved to the right hand 51·1 per cent., and to the left hand 26·2. Those heaved to the side of the greater angle were 63·5 per cent.; to the side of the smaller, 12·9; and the mean distance of the throw was 16·4 ft. This statement fully establishes the fact that the relations of right hand and left hand, of smaller angle and greater angle, cannot be adhered to invariably, and that they are applicable only to a particular mine or particular district.

Caution to Builders.—On Wednesday last, at Stratford Petty Sessions, Mr. Joseph Elliot, a builder, of 5, Haveward-road, High-street, Tooting, was summoned at the instance of the Woodford Local Board for unlawfully laying certain building materials,—mortar and other things,—upon the footpath in Chelmsford-road, Woodford, and allowing them to remain a longer time than necessary. Mr. Martin, the clerk to the Local Board, appeared for the prosecution. Mr. Holloway, the road surveyor to the Woodford Local Board, was sworn, and said that in consequence of receiving complaints from persons who said that they had run into mortar in Chelmsford-road he went to the road, where the defendant was engaged in erecting certain houses. There he found the path completely blocked up with mortar, sand, and bricks. He requested the person in charge of the operations to remove them, but the obstruction was there after that time. Mr. J. D. Hooper, the surveyor to the Local Board, said he had cautioned defendant as to obstructions of this kind, and they had remained some time after such caution; but it was all removed now. Defendant admitted that he had carted sand across the path, but said it was removed as soon as possible, and never caused an obstruction for more than a couple of hours. A little mortar might have been made on the path. The Bench said this was practically a plea of guilty. They should impose a fine of 40s., and 1*l.* 19s. 6d. costs.—*Daily Chronicle.*

Virginia Water.—The description of the insanitary condition of the lake of Virginia Water in our issue of December 12th, by a resident on the spot, surpasses anything we should have thought possible within the Royal Park at Windsor under the immediate supervision of the Ranger and Deputy-ranger appointed to superintend the Royal Estates. Royal and Crown property are not subject to the local authority, as specially appointed officials are presumed to render further supervision unnecessary. But if the condition of the lake of Virginia Water is a fair example of the way these duties are discharged, the time has come for an alteration in the existing order of things. It is not to be expected that his Royal Highness Prince Christian, who holds the position of Ranger of the Forest, should inspect sewers or sewer-impregnated lakes. Such duties are not expected of Princes, for they, like Cæsar's wife, are above suspicion. The office is a sinecure for the maintenance of princely dignity. But there are deputies who are responsible for the discharge of these duties, for the protection of the health of Her Majesty and the rest of the Royal Family, as well as the general public, who, by the sanction of the Crown, use the lake at Virginia Water for summer recreation. Royal water parties take place also here, to the risk of health and life, if the account given by our correspondent is only half as bad as he represents it to be.—*Lancet.*

Heating and Ventilating.—Some of the most recent applications of the Æolus Water Spray Company's system of heating, cooling, and ventilating, are at the following buildings: School of Science and Art, Lincoln; the Convent of St. Lawrence's Sisterhood, Belper; Page-green and West-green Board Schools, Tottenham; St. Barnabas Church, New Humberstone, Leicester; Priory Chapel, College Walk, Maidstone; New Docks Offices, Bristol; Town-hall, Stratford, E.; New Liberal Club, Birmingham; and the Staffordshire Bank, Union-street, Birmingham.

Rugby.—The east window of the south aisle in Hillmorton Church, Rugby, has been filled with stained glass representing figures of our Lord as the Good Shepherd and SS. Peter and John, with canopies and other ornamental detail, designed and executed by Messrs. F. Holt & Co., of Warwick.

Mediæval Bricks.—The introduction in Germany of facing bricks so marked and constructed as to be readily divided into halves and quarters has induced Herr W. Narden of Cassel to point out in the *Deutsche Bauzeitung* that the idea had already been perfected during the Middle Ages. The observations made by Herr Narden during the restoration of old brick edifices have led him to this conclusion. The economy of this method is urged by him in support of its more general adoption.

Foreign Building Hints.—In a recent number of *Science pour Tous*, a recipe is given for the artificial colouring of white marble or alabaster. A good blue is obtained by a solution of borax, in which indigo and azotate of iron have been dissolved; red, by borate of soda, any red colouring matter, and nitric acid; black, by nutgall. If marble thus treated becomes tarnished, it may easily be put to rights by drying it in a stove for one or two days.——A new varnish for iron and steel is described in *Industria è Invenciones*, as being obtained by dissolving sulphur in a warm essence of turpentine, and laying it on the article to be treated with a brush. When the essence is evaporated, there remains upon the surface a light film of sulphur, which becomes permanently fixed after being exposed for some time to the flame of a spirit-lamp. The varnish is of a deep black, and very durable.——The French Consul at Baku reports the discovery of a new and valuable wood in the forests of the Caucasus. Its qualities are,—great beauty of colour, and a property of hardening in the air, and never decaying, while it weighs three times heavier than oak, and is very easy to work. It will probably be in great request with cabinet-makers, turners, and coachbuilders, and its price is 15 francs the quintal, or about 12s. the hundredweight.

Reforms Needed at Kew.—It is not unlikely that in the course of the next few years Kew will be considerably modified by the governing powers. There can be no objection to the distinctions that are maintained by certain palisades, and whether a tract of ground is called "garden," or "park," or "arboretum," is of little consequence, provided the public have access thereto at reasonable times and seasons, and good keeping makes good work for the student and good entertainment for the pleasure-seeker. As to what shall be understood by "reasonable times," there will be differences of opinion. It may safely be predicted that the day is not far distant when the gardens will be opened at an earlier hour than at present, and that some gates now kept locked will be thrown open. But the new Director, and the Government to whom he is responsible, will have to maintain a firm stand against the doctrine of the residents of the district and the local papers in which their special interests are advocated,—the doctrine that, by reason of residence, the residents have claims superior to those of the public at large. An occasional outbreak of clamour, backed by the abuse of the local press, has to be endured by the Director of the gardens, and Sir J. D. Hooker has shown how unreasonable demands should be resisted, and the claims of science made to harmonise with the growing desire of the public for the free enjoyment of park and garden scenery. It is, we think, doubtful if the plant-houses could be opened at an earlier hour than the present because of the peculiarities of the daily work; but there can be no great difficulty in opening the gates at ten instead of twelve on week-days, and an outlet to the Old Deer Park would be a boon of great value in times of general holiday.—*Gardeners' Magazine.*

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. ....ton	6 10 0	7 10 0
Teak, E.I. ....load	13 10 0	15 10 0
Sequoia, U.S. ....ft. cube	0 2 6	0 2 9
Ash, Canada ....load	3 0 0	5 0 0
Birch ,, ...load	3 0 0	4 10 0
Elm ,, ...load	3 10 0	5 0 0
Fir, Dantsic, &c. ....load	1 10 0	4 10 0
Oak ,, ...load	3 0 0	5 0 0
Canada ....load	6 0 0	7 0 0
Pine, Canada red ....load	3 0 0	4 0 0
,, yellow ....load	3 15 0	5 5 0
Lath, Dantsic ....fathom	4 10 0	6 0 0
St. Petersburg ....load	5 0 0	7 0 0
Wainscot, Riga....log	2 15 0	4 10 0
,, Odessa ....load	3 12 6	3 15 0
Deals, Finland, 2nd and 1st...std. 100	7 10 0	8 10 0
,, 4th and 3rd ....std. 100	6 0 0	7 10 0
Riga ....std. 100	6 0 0	8 0 0
St. Petersburg, 1st yel. ....std. 100	9 0 0	15 0 0
,, 2nd ,, ...std. 100	7 0 0	8 15 0
,, white ....std. 100	8 0 0	10 10 0
Swedish....std. 100	6 0 0	15 10 0
White Sea ....std. 100	8 0 0	18 0 0
Canada, Pine 1st ....std. 100	17 0 0	31 10 0
,, 2nd ....std. 100	13 0 0	17 10 0
,, 3rd, &c. ....std. 100	7 0 0	10 0 0
,, Spruce 1st ....std. 100	9 0 0	12 0 0
,, 3rd and 2nd ....std. 100	6 0 0	8 0 0
New Brunswick, &c....std. 100	5 0 0	7 0 0
Battens, all kinds ....std. 100	4 0 0	12 0 0
Flooring Boards, sq. 1 in.—Prepared, first ....sq.	0 9 0	0 13 0
Second ....sq.	0 7 6	0 8 6
Other qualities ....sq.	0 5 0	0 7 0
Cedar, Cuba....foot	0 0 3½	0 0 4
Honduras, &c. ....foot	0 0 3	0 0 4
Australian ....foot	0 0 3	0 0 3½
Mahogany, Cuba ....foot	0 0 5	0 0 7½
St. Domingo cargo av. ....foot	0 0 5½	0 0 7½
Mexican ,, ...foot	0 0 4	0 0 5
Tobasco cargo av. ....foot	0 0 4	0 0 6½
Honduras cargo av. ....foot	0 0 4½	0 0 6½
Maple, Bird'seye ....foot	0 0 3½	0 0 6
Rose, Rio ....ton	7 0 0	16 0 0
Bahia....ton	6 0 0	14 0 0
Box, Turkey ....ton	5 0 0	18 0 0
Satin, St. Domingo ....ft.	0 0 0	0 0 0
Porto Rico ....ft.	0 0 0	0 0 0
Walnut, Italian ....ft.	0 0 4	0 0 5

METALS.	£. s. d.	£. s. d.
IRON—Pig in Scotland ....ton	2 2 6	0 0 0
Bar, Welsh, in London....ton	4 15 0	5 0 0
,, ,, in Wales ....ton	4 7 6	4 10 0
,, Staffordshire, London ....ton	5 15 0	7 0 0
Sheets, single, in London....ton	7 10 0	9 0 0
Hoops ,, ...ton	6 5 0	7 5 0
Nail-rods ,, ...ton	5 15 0	7 0 0
COPPER—		
British, cke. and ingt. ....ton	43 10 0	44 10 0
Best selected ....ton	45 0 0	46 0 0
Sheets, strong....lb.	52 0 0	0 0 0
,, India....lb.	48 0 0	48 10 0
Australian, fine cash....lb.	0 0 0	0 0 0
Chili, bars ,, ...lb.	41 0 0	41 15 0
YELLOW METAL....lb.	0 0 4¾	0 0 4¾

METALS (*continued*).	£. s. d.	£. s. d.
LEAD—Pig, Spanish ....ton	12 2 6	12 5 0
English, com. brands ....ton	12 10 0	12 12 6
SPELTER—		
Silesian, special ....ton	15 2 6	15 5 0
Ordinary brands ....ton	14 17 6	15 0 0
TIN—		
Banca ....ton	96 0 0	0 0 0
Billiton ....ton	94 0 0	0 0 0
Straits ....ton	93 2 6	93 12 6
Australian ....ton	93 5 0	93 15 0
English ingots....cwt.	97 0 0	0 0 0
ZINC—		
English sheet ....ton	0 0 0	0 10 0

OILS.		
Linseed ....ton	20 0 0	20 5 0
Cocoanut, Cochin ....ton	30 0 0	0 0 0
Ceylon ....ton	26 0 0	0 0 0
Copra....ton	0 0 0	0 0 0
Palm, Lagos ....ton	29 10 0	0 0 0
Palm-nut Kernel ....ton	25 0 0	25 10 0
Rapeseed, English pale....ton	23 10 0	0 0 0
,, brown ....ton	21 10 0	21 15 0
Cottonseed, refined ....ton	17 0 0	19 0 0
Tallow and Oleine ....ton	25 0 0	40 0 0
Lubricating, U.S. ....gal.	7 0 0	10 0 0
,, Refined ....gal.	4 0 0	12 0 0
TURPENTINE—		
American, in cks. ....cwt.	1 6 9	1 7 0
TAR—Stockholm ....brl.	0 19 0	0 19 6
Archangel....brl.	0 12 0	0 12 6

TENDERS.

BRISTOL.—For alterations and additions to premises, St. Augustine's-place, Bristol, for Messrs. J. Smith & Son. Mr. Henry Williams, Clare-street, architect. Quantities supplied by Mr. A. Barratt, Somerset-chambers, Corn-street:—

Ridewood & Wright	£1,429 0 0
H. A. Forse	1,400 0 0
Walters & Son	1,390 0 0
J. Perkins	1,380 0 0
Eastabrook & Sons	1,350 0 0
G. Humphreys	1,331 0 0
T. Brown	1,320 0 0
J. Baston	1,295 0 0
Chorley & Son	1,254 0 0
A. J. Beaven	1,250 0 0
T. Thomas	1,247 10 0
T. R. Lewis	1,235 0 0
J. Clark	1,227 0 0
W. Church	1,147 0 0
R. Wilkins & Son	1,145 0 0
J. James	1,098 0 0
S. Turner	1,043 0 0
J. Wilkins (accepted)	1,040 0 0

[All of Bristol].

BRONDESBURY.—For dwelling house, in Salisbury-road, Brondesbury, for Mr. W. H. Coles. Quantities supplied:—

Keyes, Head, & Co.	£3,349 0 0
J. Blyth	3,329 0 0
T. Boyce	2,963 0 0
Higgs & Hill	2,894 0 0
G. H. & A. Bywaters	2,883 0 0
A. Bush	2,835 0 0
H. & E. Lea (accepted)	2,793 0 0

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
New Wing to Buildings	East London Hospital...	Not stated ...	March 1st	i.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Alterations, &c., King's Hotel, Margate	The Proprietors	A. Drew	Jan. 6th	xxxii.
Roadmaking and Paving Works	Fulham Board of Wks.	*Official*	do.	ii.
Granite Spalls	Fulham Union	do.	Jan. 7th	xxxii.
Completing Four Large Shops, Harlesden		T. F. Shaw	do.	ii.
Roadmaking, Excavating, &c.	Met. Asylums Board	Pennington & Brigden	Jan. 8th	ii.
Granite Kerb	Folkestone Corporation	A. W. Conquest	Jan. 9th	xxxii.
Stores and Materials	Liverpool Corporation	*Official*	do.	ii.
New Street Works	St. Giles, Camberwell...	do.	Jan. 11th	xxxii.
Water Supply Works	Shepton Mallet R.S.A.	do.	do.	xxxi.
Brick Sewer	Tottenham Local Board	— De Pape	Jan. 12th	ii.
Kerbing, Tar-paving, &c.	Lewisham Board of Wks	*Official*	do.	ii.
Removal of Dust, Dirt, &c.	Crown Estate Com....	do.	Jan. 13th	xxxii.
Alterations, Additions, and Repairs	Lambeth Guardians	T. W. Aldwinckle	do.	xxxii.
Play-room and Repairs to School	Guardians of St. Mary, Islington	W. Smith	Jan. 14th	xxxi.
Erection of Urinals	Fulham Board of Wks.	*Official*	do.	ii.
Wood Paving	do.	do.	do.	ii.
Main Drainage Works	Finchley Local Board...	G. W. Brumell	Jan. 15th	xxxii.
Sewage Works	Dorking Local Board...	Smith & Austin	Jan. 18th	ii.
Erection of New National Schools at Felpham		Gordon M. Hills	do.	xxxii.
Schools	Northfleet School Brd.	*Official*	do.	xxxii.
Works and Materials	Wandsworth Bd. of Wks	do.	Jan. 19th	xxxii.
Wharf, New Dock Wall and Sewage Works...	Plymouth U.S.A.	G. D. Bellamy	Jan. 23rd	xxxii.
Painting Station at York	North Eastern Railway	H. Copperthwaite	Jan. 27th	ii.
Extension of School, &c.	Met. Asylums Board	A. & C. Harston	Jan. 29th	ii.
New Lunatic Asylum	Derby Corporation	B. S. Jacobs	Jan. 30th	xxxii.
Boundary-Walls, Abutments, &c., for Bridge	Colne and Marsden L. B.	H. Bancroft	Feb. 2nd	ii.
Ironwork for Bridge	do.	do.	do.	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Assistant Surveyors	Civil Service Com.	Not stated ...	Jan. 5th	xxviii
Building Inspector	Willesden Local Board	2*l.* 10s. per week ...	do.	xxviii

HORNSEY.—For alterations and additions to Roden, Hornsey-lane, for Mr. R. T. Broome. Messrs. H. Parkhouse & Co., architects and surveyors, Crouch End Station:—

Gladwell & Sons, Stroud-green (accepted)	£933	0	0

LEYTONSTONE.—For houses, Leytonstone-road, for Mr. D. Davy. Mr. F. Boreham, architect:—

Robey	£1,887	17	10
J. Grover & Sons	1,757	0	0
Bane	1,715	5	0
Nicholls	1,649	10	0
Buckle	1,584	0	0
L. & H. Roberts	1,529	0	0
Morter	1,499	0	0
Gregar	1,476	0	0
Catley	1,449	0	0

LONDON.—For alterations to Nos. 196, 198, 200, 202, 204, and 206, Well-street, and 40, Valentine-road, South Hackney, for Messrs. Cooper & Co. Mr. G. Chuter, architect:—

Hall, Beddall, & Co.	£2,693	0	0
Thomerson & Son	2,550	0	0
Lawrence	2,380	0	0
Wetherilt, Lee, & Martin	2,370	0	0
Coleman	2,345	0	0
Laughton	2,275	0	0
Ryderhurst	2,232	0	0

LONDON.—For rebuilding the Marquis of Granby public-house, in the new street leading from Piccadilly to Bloomsbury. Messrs. Wylson & Long, architects, King William-street, Strand. Quantities by Mr. Arthur W. Saville, Strand:—

Kynock	£4,100	0	0
Jerrard	3,959	0	0
Belham	3,949	0	0
Beale	3,887	0	0
Walker	3,830	0	0
Ward & Lamble	3,697	0	0
Anley	3,690	0	0
Lamble	3,650	0	0
Wells & Co.	3,600	0	0
Cooke	3,591	0	0
Oldrey	3,587	0	0
Shurmur	3,582	0	0

LONDON.—For office fittings, at 6, Finch-lane, E.C., for Mr. Charles Deakin. Mr. Arthur W. Saville, architect, 99, Strand. Quantities supplied:—

G. T. Pain & Co.	£275	0	0
Ward & Lamble	210	0	0
Royal	2 9	15	0
Cook	197	10	0

LONDON.—For proposed rebuilding of 32, Cornhill, and 1, Cowper's-court, E.C. Messrs. l'Anson & Son, architects. Quantities by Messrs. D. Campbell & Son:—

G. Trollope & Sons	£8,984	0	0
J. Grover & Son	8,688	0	0
G. Shaw	8,635	0	0
J. Mowlem & Co.	8,614	0	0
T. H. Adamson & Sons	8,600	0	0
W. Cubitt & Co.	8,520	0	0
Holland & Hannen	8,463	0	0
T. Rider & Son	8,218	0	0
Ashby & Horner	8,193	0	0
B. E. Nightingale	7,989	0	0

LONDON.—For repairs to the infirmary, St. George's-in-the-East. Messrs. Wilson, Son, & Aldwinckle, architects:—

Derby (accepted)	£115	0	0

PLASHET (Essex).—For sanitary works at the Plashet Schools. Messrs. Wilson, Son, & Aldwinckle, architects:—

Kirk & Randall	£438	0	0
R. Seed, Dartmouth Park	390	0	0
Derby, Stepney (accepted)	343	0	0

RICHMOND (Surrey).—For the erection of five houses and shops for Mr. T. Ratcliff. Mr. E. Maynard, architect and surveyor, College-chambers, Richmond. Quantities supplied:—

Sweet & Loder	£3,056	0	0
Blasby	2,796	0	0
Carless & Co.	2,767	0	0
Lillywhite (accepted)	2,750	0	0

WESTON-SUPER-MARE.—For the erection of a church at Milton, Weston-super-Mare. Messrs. Price & Wooler, architects. Quantities supplied:—

J. Wilcox, Weston-super-Mare	£1,279	0	0
A. J. Beaven, Bristol	1,175	0	0
J. Palmer, Weston-super-Mare	1,171	0	0
Durnford & Son, Bristol	1,165	0	0
J. Vowles, Weston-super-Mare	1,144	0	0
A. Krauss, Bristol	1,100	0	0
R. Lewis, Weston-super-Mare	1,089	10	0
C. Addicott, Weston-super-Mare	1,085	10	0
T. Palmer, Weston-super-Mare	1,019	0	0
R. Shorney, Weston-super-Mare	995	0	0
G. Dyer, Weston-super-Mare*	990	0	0

* Accepted.

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., *not later than Four p.m.* on THURSDAYS.

TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

W.L.D.—G.R.S.—E. W. (Mr. Aumonier's previous correction is sufficient).—H. T.—E. F. (we cannot enter into a correspondence as to the numbers and "earnestness" of congregations of City churches; we merely pointed out that the question of the preservation of the churches must be influenced to some extent by their practical use for purposes of worship, but it is out of our province to decide this point).—"Faith" (if you looked at the last paragraph of the article you would see that there was not the slightest intention to class your design as more beyond the pecuniary limits than many others).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

THE INDEX and TITLE-PAGE for Volume XLIX. (July to December, 1885) will be given as a Supplement with our next Number.

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Addressed to No. 46, Catherine-street, W.C.

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SPECIAL.—ALTERATIONS in STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office, 46, Catherine-street, Covent Garden, W.C. free of charge.* Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum PREPAID. To all parts of Europe, America, Australia, and New Zealand, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C.

Best Bath Stone, for Winter use.
WESTWOOD GROUND,
Box Ground,
Combe Down,
Corsham Down, and Farleigh Down. { Summer / Dried.
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Box Ground Stone
is the best for use in all exposed positions being a well-known and tried Weather Stone.
50,000 ft. cube in stock.
PICTOR & SONS,
BOX, S.O., WILTS. [ADVT.

Doulting Freestone.
THE CHELYNCH STONE. { The stone from these quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England.
THE BRAMBLEDITCH STONE. { Is of the same crystalline nature as the Chelynch Stone, but finer in texture, and more suitable for fine moulded work.
HAM HILL STONE.
Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.
Prices, and every information given, on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, near Ilminster, Somerset.
London Agent — Mr. E. WILLIAMS,
16, Craven-street, Strand, W.C. [ADVT.

Doulting Free Stone For prices, &c., address S. & J. STAPLE,
HAM HILL STONE, Quarry Owners, Stone
BLUE LIAS LIME and Lime Merchants,
(Ground or Lump), Stoke-under-Ham, Ilminster. [ADVT.

Ham Hill Stone! **Ham Hill Stone !!!** For Ham Hill Stone of best quality and workmanship, apply to JOHN HANN & SON, Quarry Owners, Montacute, Ilminster. Established 1837. Agents, MATTHEWS & GEARD, Albany Wharf, Regent's Park Basin, N.W. [ADVT.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90, Cannon-street, E.C. [ADVT.

EVERY DESCRIPTION OF SEASONED WOODS AND VENEERS IN EXTENSIVE QUANTITIES.

B. J. HUDSON & SONS,
Millbank Sawmills, Grosvenor-road, S.W.;
Whitfield-street, W.;
And Store-street, London, W.C.
Telephone No. 3,152, and Private Wire connecting Business Premises.

BANNER VENTILATORS.

The Strongest Exhaust Ventilators for all Buildings, Public Halls, Churches, Billiard-Rooms, &c.

HIGHEST PRIZES at all the most important Exhibitions.

BANNER SYSTEM OF SANITATION AND SANITARY APPLIANCES
WERE AWARDED AT THE
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